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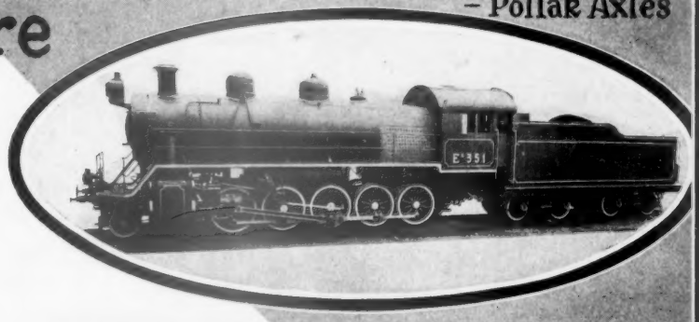

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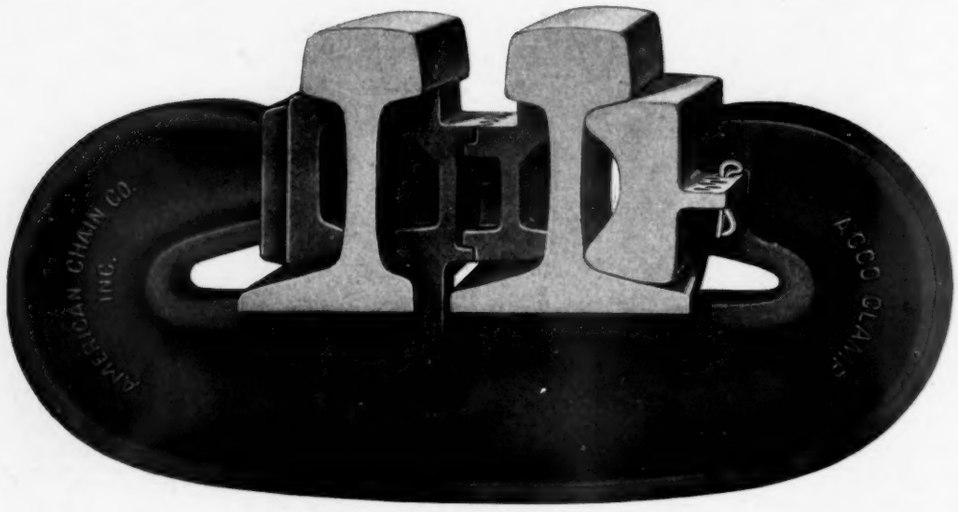

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EDITORIAL

Railway Age

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There is a tendency in some quarters to cast suspicion on those railroads which have arranged to conduct certain maintenance operations by contract. It is intimated that these contracts are but a subterfuge designed to avoid compliance with the terms of the Transportation Act, and that they are, withal, an unwarranted and unprecedented arrangement. Those who look askance at these measures may be surprised to learn that, after all, there is nothing new about such contracting, and that there is a precedent for it to an extent far exceeding anything that the railroads are now doing. An article appearing elsewhere in this issue describes the methods pursued by one railroad in contracting practically all of its operating activities, including the operation of trains, the conduct of passenger stations and freight houses and even the soliciting of traffic. All this occurred, not in recent years, but *before the Civil War*. Just what conditions were responsible for the initiation of these arrangements is not made clear. The object in view, however, is definitely stated—to reduce expenses—and the results as tabulated in the article speak for themselves. There are just two reasons why the managements of the railroad or any other commercial undertaking should let work to contract. The first of these is to have the work done more cheaply; the second is to expedite the work during times when the company's own forces and facilities are inadequate to complete it within the time available.

Nothing New About Contracting

"I think that the most serious complaint that can be made of the Railroad Administration lies in the fact that it did not return the railroads to their owners self-sustaining. . . . . It was just as much the duty of the government to return these roads with rates that would sustain them in their operations as it was its duty to return them in as good condition physically as it took them." This statement, made by Senator Cummins at the hearings before the Senate Committee on Interstate Commerce, must be regarded as one of the most valuable contributions which has thus far been made to all the arguments pro and con relative to the activities of the Railroad Administration. It must be regarded in this light not only because of its intrinsic truth but because it is the opinion of a man who is in a position to know whereof he speaks and who can speak and will be recognized as speaking with unbiased mind. The idea expressed by Senator Cummins is not new. It is restated, however, at an opportune moment, because just now the railroads in their annual reports are giving evidence of the success which they have been having during the past year in restoring their net income to the pre-war level. The figures in the case of practically every road show a great measure of improvement, the degree of which can only emphasize how much improvement there was room to make. The difficulty is, of course, that this improvement was made partly as a result of economies of a drastic sort, which economies served to intensify a period of depression sufficiently severe without that factor. The improvement similarly was partly due to higher rates—these rates having been made higher when the tendencies in industry were in the other direction. The Railroad Administration, in failing to raise its rates at the proper time, did the uneconomic thing and created a situation which has been extremely difficult to get out of. Now that we are getting out of it, is a good time to take a look back over the rough ground that has been traveled. Senator Cummins helps us do so and adds a contribution which will serve to keep the view in its correct perspective.

Not Returned Self Sustaining

Second or multiple track work always imposes a heavy burden on the operating department. The fact that the added track has been authorized is proof positive that the traffic has approached the limit of the existing track capacity. Therefore, to impose the added burden of slow orders, frequent shifts of the operated tracks, temporary run-offs, work trains, and the presence of contractors' grading equipment on the main line, and other inconveniences that go with second-track projects, adds greatly to the problems of the operating officers until the time when the pressure can be gradually reduced by the opening of section after section of the newly completed second track. Conversely, this pressure of a heavy revenue business places certain restrictions on the construction work that add to its cost. Expensive bridge construction arrangements must be adopted to avoid even an hour's interruption of traffic. In some cases the contractor may be required to build considerable stretches of construction track when the operated tracks would have served just as well but for the heavy traffic. These conflicts of the opposing interests of the operating and construction departments must be settled by compromise, and it makes but little difference which department bears the brunt of the burden, for the railroad, as a whole, suffers in any event. These difficulties can be relieved in great measures if the work is undertaken at times of light traffic. Thus, at present, the coal strike has resulted in greatly reducing the train movements on certain lines, and in the case of the Illinois Central this condition has been taken as an opportunity for the completion of a stretch of third track which has been badly needed for some time. Other railroads will find it to their advantage to follow the example of this road.

Light Traffic An Aid To Construction

It should be self-evident that the banners on automatic highway crossing signals should present a uniform aspect to the highway traveler regardless of the railroad he is approaching. In the past manufacturers have supplied banners painted according to the best known indications or have furnished special markings or designs to suit their individual tastes. This has resulted in the installation of a variety of banners which are confusing to the automobile driver who has no means of ascertaining whether all of these moving banners are intended to indicate that a train is approaching. Realizing the need for standardization, the Signal Section of the American Railway Association has recently prepared a new specification which provides that the word "DANGER" shall appear in black with a semi-circle above also in black, on

Standard Aspect for Highway Crossing Signals

a white disk 24 in. in diameter, thus presenting an optical effect of decided contrast that can be distinguished at a maximum range. Efforts are being made to secure the adoption of this specification at the annual meeting of the Signal Section in June. It would seem advisable for all railroad officers who are interested to give the matter serious and expeditious consideration in the meantime in order that a standard may be established without delay.

Increase in Car Loading up to April 1

That railroad freight traffic and general business have been improving rapidly during the early months of this year is indicated by the fact that the number of carloads of freight handled up to April 1, when the coal strike began, has been greater than it has been for any other of the past five years except the record year 1920. The total car loading since April 1 has naturally shown a reflection of the reduced coal production, but from January 1 to April 1 the total number of cars loaded with revenue freight was 9,996,184, as compared with 9,015,934 during the corresponding period of 1921, although it was less than for 1920, when a total of 10,223,813 cars were loaded. The number of cars of freight received by the railroads for transportation up to April 1 was, of course, swelled considerably by the amount of coal ordered for storage in anticipation of the strike, just as the reduction in coal loading at the present time will doubtless be made up later on when the strike is over or when the present reserves become diminished. However, there have also been large increases in the loading of merchandise and miscellaneous freight. It is also true that a carload of freight represents less tons this year than it did when the shortage of freight cars made the shippers more responsive to the efforts of the railroads to induce them to load cars to capacity. However, the tonnage and ton-mile figures will not be available for some time and in their absence the gains shown in car loading totals represent one of the reasons for optimism which have recently been reflected in a beginning of railroad purchases on a much larger scale than has prevailed for several years. While there are still some 300,000 freight cars out of service for need of repairs, the number of serviceable surplus cars had been reduced from 500,000 a year to 206,746 by March 31 this year.

The Per Cent of Bad Order Cars

The *Railway Age*, in the reviews of the operations of various railroads, which have recently appeared in its columns, has been, in a measure, emphasizing the factor of maintenance. With the increasing value of the dollar brought about by changing wage scales and material costs, it is difficult, if not impossible, to compare maintenance in one year and another on a dollar basis. Thus, if a road's expenses of maintenance-of-way show a sharp reduction as between 1921 and 1920, it is not clear whether this may be due to lesser work done, to economies in carrying on the maintenance activities, or merely to lower wage and material costs. In other words, the expenses figures do not serve the purpose. A much better basis of comparison is to be found in the tons of rail laid, ties put in track, yards of ballast, etc., and in several cases these details have been utilized. In the case of equipment, there are similar details available for use—namely, the percentage of bad order cars to total on line and the percentage of unserviceable locomotives. These figures appear in a very few cases in the annual reports. They are given in the form of a monthly and cumulative average in the operating statistics reported to the Interstate Commerce Commission and they are similarly reported—in much greater detail—to the Car Service Division of the American Railway Association. We believe these figures to be valuable and of considerably greater value than the attention that has been paid them would indicate. It is simple enough to say, for example, that if the average percentage of bad-order cars on all the roads at a certain time is, say, 14 per cent, and the X. Y. & Z. is reporting only 6 per cent, its car condition is good; or that if it reports 20 per cent, its condition is bad. Of course, we know the average of the country should be not 14 per cent but between 4 and 7 per cent; that factor must also be borne in mind. Further, there may be many cars in the bad-order list that will never be repaired but will be retired. The effect on the maintenance of equipment expenses will be similar whether the charge is to repairs or to retirements. As concerns operation, the car is not ready for service in either case. This is the reason the *Railway Age* uses the bad-order figures extensively. It believes that, if they are used properly, the bad-order percentages are of great value as an index to equipment maintenance.

The Wheel Lathe a Barometer of Shop Efficiency

It would be difficult to over-estimate the importance of modern car and driving wheel lathes in efficient railroad shop operation. Obviously cars and locomotives can be put through a repair shop no faster than tires can be turned. In fact the production and morale of the entire shop is dependent on the output of the wheel department as limited by its wheel lathes. A superintendent of motive power is quoted as saying recently, "Before I had the new 90-in. wheel lathe, the driving box gang always took its own good time because the driving wheels were always behind; but now driving wheels are always waiting for the box gang which has been compelled to speed up. This speeds up all the other gangs so the whole shop tries to keep up with the big, new wheel lathe which is the pace-maker. Naturally engines are going out faster and cost less." The modern wheel lathe is a highly specialized machine, designed to develop great cutting power and tax the capacity of high speed steel tools to the utmost. Heavy internal stresses are continuous for long intervals and price should be the last thing considered in purchasing this type of tool where there is sufficient work to keep it busy. Continuous high production during 15 or 20 years, with economy in power consumption, easy control by the operator, and freedom from breakdown are essential features which should be given first consideration in selecting wheel lathes. A railroad can ill afford to sacrifice anyone of these features for the sake of a few hundred or even a few thousand dollars in first cost. Railroads can also ill afford to continue the operation of the many inefficient wheel lathes now in constant use.

Study the Scrap Heap

A newly designed locomotive or car always and properly attracts careful attention and inspection. A shop superintendent or master mechanic invariably takes occasion to point out to a higher officer or other visitors the latest new machine or improved method which turns out more or better work than the machine or method which was replaced. This spirit is natural and commendable, but in a search for the new and spectacular do we not oftentimes overlook something that might be learned from the old or even discarded device or part? One of the most interesting spots around any shop, roundhouse or car repair yard is the scrap heap. Many a railroad man might learn a lesson from the traveling mechanical representatives of the various railroad supply firms

who early learn the importance and location of the scrap piles, no matter in what out-of-the-way corner they may be situated; immediately after calling at the office they make a bee-line for these interesting points. Here are found car brake shoes that have overlapped or crowded against the flange due to improper condition of foundation brake rigging and have had to be removed before any benefit had been obtained from a large part of the wearable metal; locomotive brake shoes tapered and hardly worn at one end due to lack of attention to maintenance of the driver brakes; brake beams distorted because of some inherent weakness in the design or improperly hung and allowed to come in contact with the wheel flanges; broken spring hangers and other worn or broken parts of locomotives and cars that have gone to the discard. Our present rolling stock has assumed much of its present form as a result of a long period of evolution and a study of failures. For a designer or one looking for improvements, something of interest can always be found by going over a scrap pile. The men responsible for maintenance also will find the time spent at such points equally profitable, even though they do not find much material that might have been repaired by welding, or otherwise, instead of being scrapped.

A Symposium on Railway Economics

Railway officers who have a desire to serve beyond the actual requirements of their ordinary duties are availing themselves more and more of opportunities to speak before chambers of commerce and other public gatherings. To do this successfully they must be well informed on railroad economics generally and keep abreast of current thought along these lines. For those who are desirous of improving their knowledge of current problems of railway economics, the semi-annual meeting of the Academy of Political Science at the Hotel Astor, New York, on April 28, offers an exceptional opportunity. Railroads and Business Prosperity is the subject for discussion and from the list of the speakers who are going to talk upon this subject it is evident that it will be treated thoroughly and ably. The meeting will be divided into three sessions—morning, luncheon and afternoon, beginning at 10 a. m., 1 p. m. and 3 p. m., respectively. The first session will be devoted to the consideration of railway labor problems, with Professor Henry R. Seager of Columbia University presiding. At this session E. M. Loomis, president of the Lehigh Valley; W. N. Doak, vice-president of the Brotherhood of Railroad Trainmen; C. B. Heiserman, general counsel of the Pennsylvania; and Professor Frank H. Dixon of Princeton University will be the principal speakers. Professor Samuel McCune Lindsay of Columbia University will preside at the luncheon session and Henry Wallace, Secretary of Agriculture; Hale Holden, president of the Chicago, Burlington & Quincy; and Walker D. Hines, formerly director general of railroads, will speak on Railway Policies and the General Welfare. Freight Rates and Business Revival will be the topic at the afternoon conference. The speakers will be T. C. Powell, vice-president of the Erie; R. H. Aishton, president of the American Railway Association; Professor W. J. Cunningham of Harvard University; C. R. Cook, vice-president of the American Rolling Mill Company; and J. D. A. Morrow, vice-president of the National Coal Association. The conclusion is inescapable that attendance at these sessions will be an education in present day railway economics. Certainly railway officers who are seeking to increase their service and who feel the need of further knowledge of current developments in railway economics will do well to attend these sessions in person or, if that is impossible, to study the proceedings when they are published.

The Permanency of Pole Lines

The extensive use of timber for pole lines has made such inroads upon the supply of suitable species of wood that the costs are becoming so high as to force pole-using companies to seek means of construction that will give greater permanency. Also the labor costs of replacing poles and the damage to the line wires when making changes represent a high percentage of the operating costs. Increased life of pole lines may be secured by treating the butt of the poles with preservatives or by banding them with other materials, such as expanded metal or reinforced concrete. The average 30 ft. western cedar pole costs approximately $5.50 in the central states and has a life of from 12 to 18 years, while this same pole butt-treated with a preservative at an additional cost of $3.50 is said to last for approximately 36 years. The Telegraph and Telephone Section of the A. R. A. recently presented a detailed estimate of a 93-mile pole line, showing that the additional investment for wood preservative will produce a saving of over $3,000 per year during the 36-year life of the poles. On the average railroad which expects to construct additional tracks, change grades, etc., the added expense for a pole line with a life of more than 36 years might not be justified. However, at corner turns, crossing spans, terminal poles and transformer locations, the labor cost for transferring equipment when renewing poles is so high that still more permanent construction, such as reinforced concrete, is being used to some extent; the advisability of its more general use on railroads considered as permanently located is also being studied. A 30-ft. reinforced concrete pole costs from $28 to $49, depending on the number of wires to be carried. Therefore in order to justify the additional cost, permanency must be the first consideration. With the increased installation of railroad-owned telegraph, telephone, signal and power lines the railroads have a vital interest in the cost of construction and maintenance of the poles used and it would seem advisable for them to offer every assistance to the Telegraph and Telephone Section of the A. R. A in securing data concerning the life of pole lines.

The Mogul Obsession

Will newspaper reporters ever learn that, as motive power for heavy passenger and freight service, the Mogul locomotive is no more? Recently bandits held up main line freight train on one of the largest roads in the East. In telling the public about it the next morning one of New York's greatest papers said in all solemnity that the train was drawn by a large locomotive of the Mogul type. Well, perhaps it was, but we doubt it. The chances are several hundred to one that few up-to-date roads are using Moguls in heavy main line freight service. About a year ago there was a serious accident not far from Chicago involving two limited trains. Once again we were told by the big dailies all over the country that the locomotives in the accident were Moguls. They published photographs of the engines, however, which showed that they were Pacifics. The obsession about Moguls is just a symptom and is not the disease itself. Or to say the same thing in other words—the reporters, assigned by many of our best newspapers to "cover" railroad news, know little or nothing about the subject. Consequently, when there is a big accident or some other news involving technical railroading, the newspapers find themselves completely at a loss. As a result, when a railroad man reads what they say, he can get no adequate idea of just what has happened, but has to seek accurate information elsewhere. There is little specialization in an American newspaper office outside the fields of politics, sports, the theater, finance and literature. The same reporter may in any week be assigned to such various

subjects as a murder case, a strike of garment workers, a meeting of the W. C. T. U. and a collision on the X. Y. & Z. Railroad. He cannot be an expert in so many lines. Consequently omissions and inaccuracies creep into almost everything he writes. In England they do things differently. There court cases are reported by men trained in the law, medical matters by doctors, railway affairs by men with railway experience, and so on. One of the most important steps toward improving the quality of railway news in our daily papers would be taken if railway officers would protest to papers in which they find inaccurate information.

Attacking the "Recapture" Provision

THE *Railway Age* believes that from the standpoint of the railways as a whole a serious mistake will be made if the plan now being considered for attacking in the courts the so-called "recapture" provision of the Transportation Act is carried out. The railways themselves are opposing repeal of the rate-making provision of the Transportation Act. A successful attack in the courts upon the recapture provision probably would make inevitable the repeal of all the rate-making provisions. The mere beginning of litigation to test the recapture provision might under present conditions be sufficient to cause Congress to wipe out all the rate-making provisions.

The recapture provision is, of course, that which requires any railway which earns over six per cent in any year to in effect pay one-half of the excess earnings over to the government. From a constitutional point of view this provision may be assailable, but the Supreme Court of the United States upheld the Adamson law, which from a constitutional point of view surely seemed much more vulnerable than the recapture provision. The Supreme Court has upheld many kinds of railway legislation which our legal friends did not expect it to. The *Railway Age* hazards a layman's prediction that if a case involving the constitutionality of the recapture provision ever reaches the Supreme Court it will be upheld.

There is involved a question of public policy and of railway policy far more important than the question of law. The purpose of the rate-making provisions was to insure that the railways as a whole would be allowed to earn a reasonable average return. It was argued by some, however, that if the average return allowed to be earned by all the railways should be reasonable the returns earned by the more prosperous individual railways would be excessive. The *Railway Age* never accepted this argument as logical or fair. On the most rigorous "fair return" theory of reasonable rates it must be that if the railways as a whole earn only a fair average return the rates from which it is derived are reasonable. How can the net return of an individual railway be excessive if it is derived from rates which for the railways as a whole are reasonable?

However, facts are stubborn things. In every important rate case for years the making of rates which would be reasonable for the railways as a whole was successfully opposed with evidence and arguments which convinced commissions and the public that under these rates the returns earned by the more prosperous railways would be excessive. Many railway executives and financiers favored the recapture provision because they were convinced that without some such provision in the law rates never would be permitted to be made which would enable the railways as a whole to earn an average return which would be reasonable for all and enable them to raise needed amounts of new capital.

The situation in this respect has not changed since the Transportation Act was passed. There is no evidence whatever that Congress, commissions or public have been convinced that the rates should be made high enough to enable some railways to earn relatively large returns in order that the railways as a whole may be enabled to earn a reasonable average return. So long as the sentiment of Congress, commissions and public remains what it apparently is now it seems most probable that a successful attack upon the recapture clause would involve the complete destruction of the rate making provisions. It seems very likely the result would be in the long run that the more prosperous railways would not be allowed to earn and keep any more money than if the recapture provisions were retained, while the poorer roads and the average roads would not be allowed to earn and keep as much money as they would be if the recapture provisions were retained.

If the railways want to get rid of the recapture provisions without at the same time completely destroying the rate-making provisions they should take their case to Congress and the public and not to the courts. If they go to the courts and win it is to be feared that as in some past instances they will merely win a battle and lose a campaign unless they also present and win their case in the court of public opinion

On What Basis Should Paint Be Bought?

OF THE THOUSANDS of materials which the railroads buy there is probably none which proves more troublesome to the purchasing agent and to the department using it than paint. The policy adopted with regard to the paint question is serious in its consequences. Paint, considered in the broad sense as including enamel and varnish, forms one of the large items in the expenditure for supplies. To meet the needs of all departments requires material of varying character, color and composition. Scores of different products are bought and as there are over 200 paint manufacturers doing more than a local business, the range of choice of the purchasing department is almost unlimited.

In general, railroads follow one of three methods in buying paint. Some buy on practically no consideration except price. Often these roads have a specification, so called, but it allows so much latitude or is so seldom enforced that it affords no assurance of the quality of the product. In contrast with this many of the large roads have detail specifications, and every shipment of paint is checked in the laboratory to make certain that it conforms to the requirements. Another practice followed by some roads is to specify the purpose for which the product is to be used, leaving the composition to the judgment of the manufacturer and holding the maker responsible for the service obtained. Bidding is restricted to a limited number of well-established companies. Results are checked by service tests and any manufacturer whose product does not give satisfactory service is removed from the list of bidders.

Recently there has been a noticeable tendency on the part of some railroads to try to save money by buying paint solely on a price basis. This is one of the worst crimes that has been committed in the name of economy. The economy of paint is not measured in cents per gallon, nor in square feet covered per gallon. The cost of the paint is usually less than the labor of applying it. The combined cost of paint and labor is usually insignificant in comparison with the value of the equipment or structures which it protects. To determine the true value of a paint, it is necessary to consider the first cost, the covering properties, the cost of application, the time the equipment is out of service and the length of time between paintings. How many roads have ever had a report on paint that considered all these factors? Is not such an analysis justified when many roads spend from $50,000 to $100,000 for each of several varieties of paint? These are some of the fundamentals which is now causing more than one road serious concern. Other phases of the question will be discussed in succeeding issues.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated.*]

Public Relations Work and Advertising

BOSTON, MASS.

TO THE EDITOR:

We have waited long—oh, so long—for you to recognize the continued neglect, and in many cases the utter abandonment by many American lines of two important essentials of successful railroad management—public relations work and advertising. However, if this recognition has been delayed, your perception and understanding of the situation has certainly been clearly and forcefully presented in your excellent editorials in recent issues. Indeed, it makes in every respect an admirable introductory text to a study of the problem that exists—a text, in fact, that is worthy of thought upon the part of those who decide questions of policy. Truly you have hit the mark and hit it hard!

During the last year and a half the slogan of a closely related industry, the electric railways, has been "Salesmanship in Transportation." At last its bigger, older, and we wonder if not characteristically more conservative, brother seems to be rubbing his eyes, and speculating why the awakening process has been so slow.

As you point out, the railroads have really got something to sell. Today they have competitors, imitators, call them what you will. Yet railways should certainly lay claim that theirs is the genuine, the best, form of transportation. And there is a wealth of reasons to support such a claim. Without expanding upon this point, however, the truth is that railroad men, both officers and employees, have been convinced that the rails constitute the standard method of transportation. It has been the strength of this assurance that has been detrimental. The lack of aggression on the part of the roads has been the opportunity of the relatively weak electric roads and the motor trucks. Now the situation does seem to be pretty well appreciated, but the realization was admittedly very slow.

It is the passenger service, however, that I am especially considering. Let us ask a few pertinent questions.

Take any large city: How many people know what points of special interest are located within 50 miles by rail?

Take the city that is not a metropolis: How many people know to what principal points its railroads radiate, to what places through trains, including Pullman cars, are operated?

Take the smaller town out "on the line." How many of the people know the destinations of the trains that they see every day? How many have even a hazy idea of the distance to the destination of these trains, the distance in hours as well as in miles?

How many citizens of any of these communities have ever heard a railroad representative at any sort of public gathering?

To most readers of the *Railway Age,* Niagara Falls and the Mammoth Cave are not unfamiliar—we know how quickly and easily these places may be reached. And so rather unconsciously we assume that the average person knows all about these and other pleasure resorts. The contrary is true. A great new generation has sprung up that knows virtually nothing of these wonders in every part of the country. Tell them about these things, educate them until they want to go and see.

Also there is a vast multitude, not undesirable either, which has never enjoyed a Pullman car or visited a diner. The issue is clear: We have got to drive away, through the carefully planned dissemination of information, firmly rooted beliefs common to a large class, that these luxuries are only intended for and within the reach of millionaires.

Let us mention in passing the observation car. Assuredly, from an operating standpoint, particularly here in the east, it has many objections. And yet even if not actually much used by passengers (I am speaking here only of the platform), because of road conditions, its very presence on a train, both in the terminal and along the line is worth pages of advertising.

Keep up the good work you have started. If we must consider our various railroad systems as necessary utilities, let us have continually before us the principle that volume of traffic carried measures the degree to which a railway is a public servant. More advertising, closer public relations. Bigger, better business. But don't wait for it to come—go get it, fight for it, make it. C. RADFORD SANDS.

Educate Employees in the Use of Appliances

BROOKLINE, MASS.

TO THE EDITOR:

Every description of a new locomotive carries a lengthy list of appliances, all more or less complicated. Many are so generally used that they are accepted as a matter of course; others are still in the development stage. That these improvements will come in time no one denies. Orders for recent equipment show that. How are these devices to be handled by the men and what steps will be taken by the management to instruct them in their proper use?

Most of the men who sit at the throttle today entered the service of the railways through the attraction railroad life had for them. This class of men is fast disappearing and those who are entering the service now enter it only because of the pay envelope. Unless something happens, it is going to be these men that are going to handle our trains.

The back head of the boiler of a modern locomotive today presents a mass of pipes, gages, cocks, valves and levers, with the use of which the engineman must be familiar and every new device added means an additional something for the man in the cab. When we hear of a green fireman making the excuse to the engineer that his steam was low because he did not know how to blow her up, the problem becomes serious.

To my mind there is only one cure for it and the mechanical department must act right soon. Engineers and firemen must receive a more thorough and better training in regard to the proper use and care of the locomotive and new devices. Call it going to school if you will, make it compulsory if necessary. Do it in the lay-over on the runs, take the men who are there on the spare board and pay them for the time spent in the class room. Have as many pieces or parts as necessary; extend it to the roundhouse men; include shop men if you wish; but to carry the thing through to a success, compulsory attendance must be enforced.

Would the men kick at this? Doubtless some would. Some would kick at anything anyway. But, I'll guarantee that the brotherhoods would stand behind this plan, would probably be willing to reproduce some of the material in their publications and, moreover, public opinion would shortly silence any opposition from any party, once it was learned what was being attempted.

As for the expense, it would be slight compared to the results. Can anyone imagine what the saving would be to have every engineer and fireman thoroughly interested in his

locomotive to see that it is in proper condition, that the roundhouse forces are interested in doing a thorough and an honest job when it is reported to them? Can anyone estimate these savings? Is it possible, and is it not worth trying? Without some direct handling of this subject the American railways within the next 25 years are going to lack the sound timber they have been producing for locomotive engineers and will have themselves solely to blame.

CHAS. E. FISHER.

For a Better Understanding Between the Railways and the Public

NEW YORK

TO THE EDITOR:

Your recent editorials on railway advertising are much to the point. The railways are spending little or no money on making their facilities or their attractions known. The propaganda of the railway executives is about the driest reading imaginable. At the present time the interest in railway day-to-day affairs is at the lowest ebb.

Years ago the people talked of railway items, but such is no longer the case. No one seems to care about train performance, or the performance of individual engines. Before me I have a current English railway magazine full of such items. There are seven pages of replies to correspondents inquiring about the Midland coat-of-arms, locomotives on Isle of Wight, the largest station in the world, etc. All of this evidences the deep interest of the travelling public. Our lines have become highly standardized, but nevertheless there is much that might be told of daily interest. Clean engines should always appeal to the traveler and the naming of locomotives is not a matter to be considered as of no advertising value—especially of large passenger engines.

Music is essential in the army; so are the small items of the daily doings of the railways to a real interest in their welfare. Tactics in the army and tons per mile on the railway are not for everybody. If one of the large systems were to paint an engine pink and send it over the system, the fact would get into all local papers and the line would be talked about in thousands of homes where ton-miles are unknown. This would not minimize the importance of study of train loads to those who are responsible for them. One recalls the Ghost train of the old New England road in this connection.

Your editorials speak of the selling of transportation as the sole function of a railway. Technically so, but not the real fact. What a railway sells is the community it serves to the rest of the world in competition with other communities; in other words, it sells transportation plus service, and service covers many factors, such as punctuality and properly timed trains in passenger service, proper freight car supply, efficient local freight service, smooth handling of trains, minimum destruction of merchandise in transit and not a few other items. This will not be done as it should be till some line establishes a service department with an executive in charge who will have time to study the requirements of the line intimately—not incidentally. He will ascertain traffic which needs encouragement—the establishment of, say, fruit or fish trains, and likewise in passenger service—make people travel, for one reason or another, more often than they otherwise would. To such an officer should come all complaints, it being his prime duty to investigate them and not to have such complaints pigeon-holed. He should seek the boards of trades, tell them how they can create new business, ask what can be done to help them; this in contrast to the boards of trade seeking the railway officials and asking or demanding why such and such business is being handled in an unsatisfactory way.

Many of our lines are so large that with the present system of executive organization the actual contact with the communities and the personnel is of a most superficial nature and if the systems are merged as has been discussed, it would be less. The effect of the recent mergers in England in this respect will be watched with interest. Till the soil well, plow deep, rather than cultivate too large a field superficially. One railway under present conditions in a highly competitive territory is earning nearly 10 per cent, due to the service rendered. The same line a few years ago was in a deplorable condition.

There are over 57 varieties of the railway problem and most of them are just human problems which can be and only can be solved as human problems have to be; by knowledge, fraternity and honesty.

I am not unmindful of the excellent work done by the Long Island in its agricultural experiment station; of its showing the farmers how to ship commodities to secure the best market prices. The war stopped such work but its need exists today in many sections. James J. Hill, I believe, at one time distributed many thoroughbred bulls along the Great Northern; but such efforts have been few and far between.

More advertising in printer's ink and in every way ought to be distinctly helpful to railways and to a better understanding between the railways and the public.

GEORGE B. LEIGHTON.

Another Complaint Against American Passenger Service

NEW YORK CITY.

TO THE EDITOR:

I was pleased to read in your journal of April 15, Mr. Langdon's able attack on the ridiculous designs of the steel cars now in use on American railroads.

In yet another way, however, have American railway men proved their inferiority to their English contemporaries in the handling of passenger traffic. I refer to the absurd platform accommodations provided at most passenger stations.

These platform accommodations are inadequate in two essentials. In the first place they are seldom higher, and often lower, than the top of the rail, making necessary the use of steps in entering or leaving the cars. In the second place, many double-tracked railroads have only one platform for trains in both directions, necessitating the crossing of tracks by passengers. Not only is this an unsafe practice which, moreover, blocks both running tracks when only one is in use, but it also makes necessary the use of a step box, since the platforms cannot, under such an arrangement, be higher than the top of the rail. The use of the step box further slows up the loading and unloading of trains.

The adoption of the English scheme of two platforms on the car floor level would, of course, restrict clearances to some extent and would involve minor changes which could be brought about over the entire country only during a period of years. My complaint is that practically nothing is being done to initiate this innovation. We do have raised platforms in ample number at a few of our metropolitan stations, but other stations even in same city are not so equipped. The result is that steps and trap doors have to be provided. If the raised platform were generally adopted, these steps could be done away with entirely—this, in addition to providing greater safety and comfort for passengers and reducing the waiting time of trains at stations about 75 per cent.

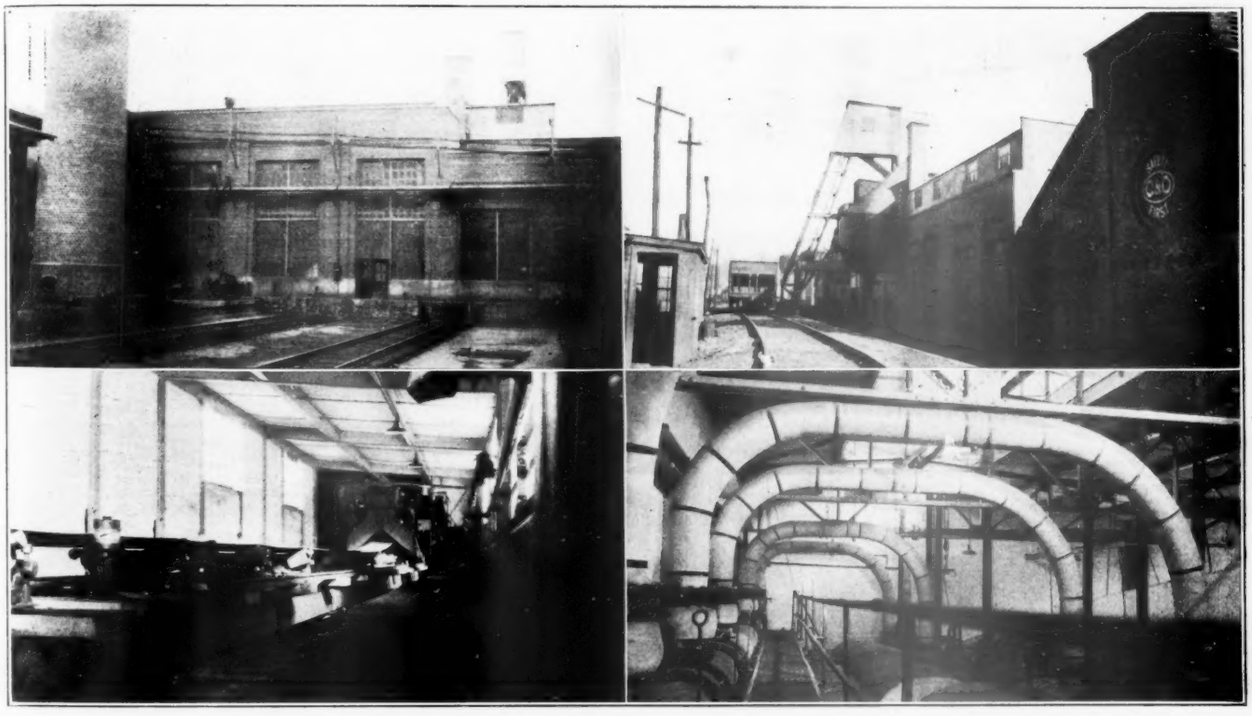
Will some of the officers of our roads which enjoy a heavy passenger traffic tell us why no steps are being taken to bring about these improvements, the need for which is so obvious?

R. C. LEWES.

New Locomotive Facilities at Clifton Forge, Va.

The Chesapeake & Ohio Has Provided a New Roundhouse, Power Plant and Other Utilities in a Congested Location

To meet the rapidly growing requirements for locomotive repair and terminal operations at Clifton Forge, Va., the Chesapeake & Ohio has prosecuted a program of intensive rehabilitation and renewal of the facilities at that point. This work has resulted in the recent completion of the new 10-stall roundhouse, a power plant, a storehouse, an oil house and a lavatory and locker building. This work had its inception in 1917, when it became apparent to the officers of the railroad that the facilities at Clifton Forge were becoming inadequate. The situation was aggravated by the enormous growth of traffic during the war period, and after an extended study of the situation work was undertaken actively late in 1920.



Above—Two Exterior Views of the Power Plant. Lower Left— Belt Conveyor for the Coal Handling Equipment. Lower Right—View Above the Boilers Showing the Steam Headers

The Roundhouse Has Long Stalls

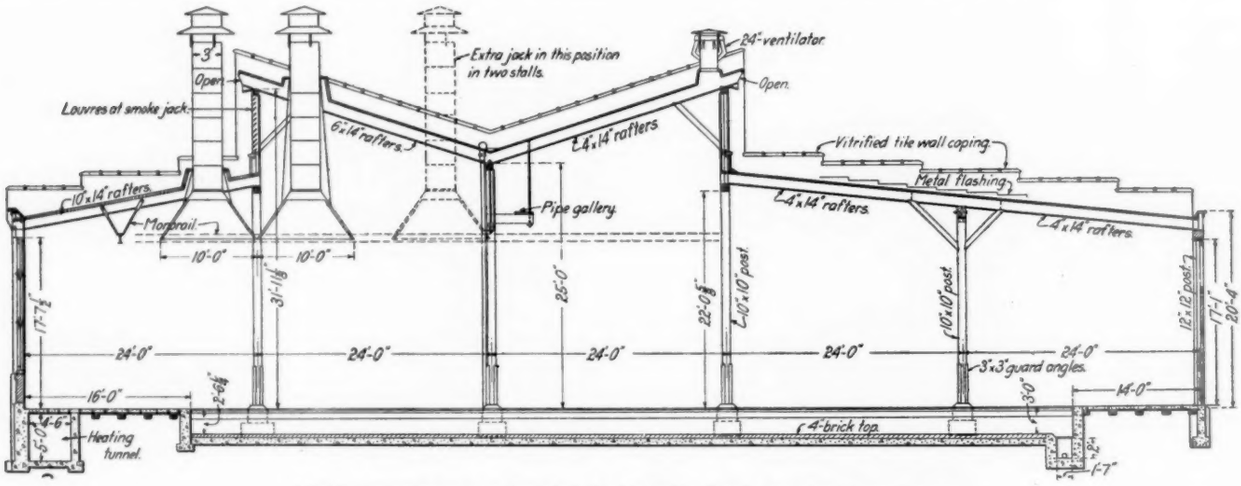
Clifton Forge is an important division point on the main line at the junction with the James River division and midway between engine terminals at Hinton, W. Va., and Charlottsville, Va. Heavy grades on all lines leading to and from Clifton Forge require the use of the heaviest type of locomotives and Clifton Forge is the logical location for the engine terminal, as well as for shops for running repairs and certain heavy repairs. The space available for shops and terminal buildings and for the necessary track facilities is limited by hills on one side and by the Jackson River on the other; the problem was further complicated by the fact that the existing buildings were very close together and by the necessity for minimum interference with the shop and terminal operations during the alterations and improvements. Because of the obstacles imposed to any construction work, a plan was perfected for taking down certain of the old buildings and rebuilding over the same area.

The new roundhouse has 10 stalls, the greater number of which are 120 ft. deep. The section of the building is similar to the one constructed at Richmond, Va., where it was found that the arrangement of the roof, together with the outlets at the edges of the monitors and the louvred openings in the monitors, provided adequately for the escape of smoke, gases and steam. This will be seen readily by referring to the drawing showing the roundhouse in section. The roof rafters and purlins are laid radially from the center of the turntable, the roof sheathing or deck being laid cross-wise over them. There are no pockets or obstructions under the roof sheathing to prevent the movement of smoke along the sheathing to the outlets in the monitor, and the removal of gases from the building is accelerated by the action of wind across the roof, similar to the action in a properly designed roof ventilator.

This building is constructed with a concrete foundation and side walls, extending up to the window sill line. From that level to the eaves, the side and end walls are brick. The building columns and the superstructure framing throughout, including the roof sheathing, are of wood. The roof deck is covered with a four-ply, pitch and slag roofing. The engine doors are 14 ft. wide by 17 ft. 1 in. high, heavily reinforced with iron hinges and provided with hand-operated locking devices for holding them either in a closed or open position. The engine pits are of a very heavy design which has been adopted by the railway as standard. A truck and tender wheel drop pit, equipped with a Watson-Stillman hydraulic

jack, embraces two of the engine pits. Two driving wheel drop pits, also equipped with jacks, have been provided. The building has a concrete floor throughout and the engine pit walls are all capped with heavy oak jacking timbers.

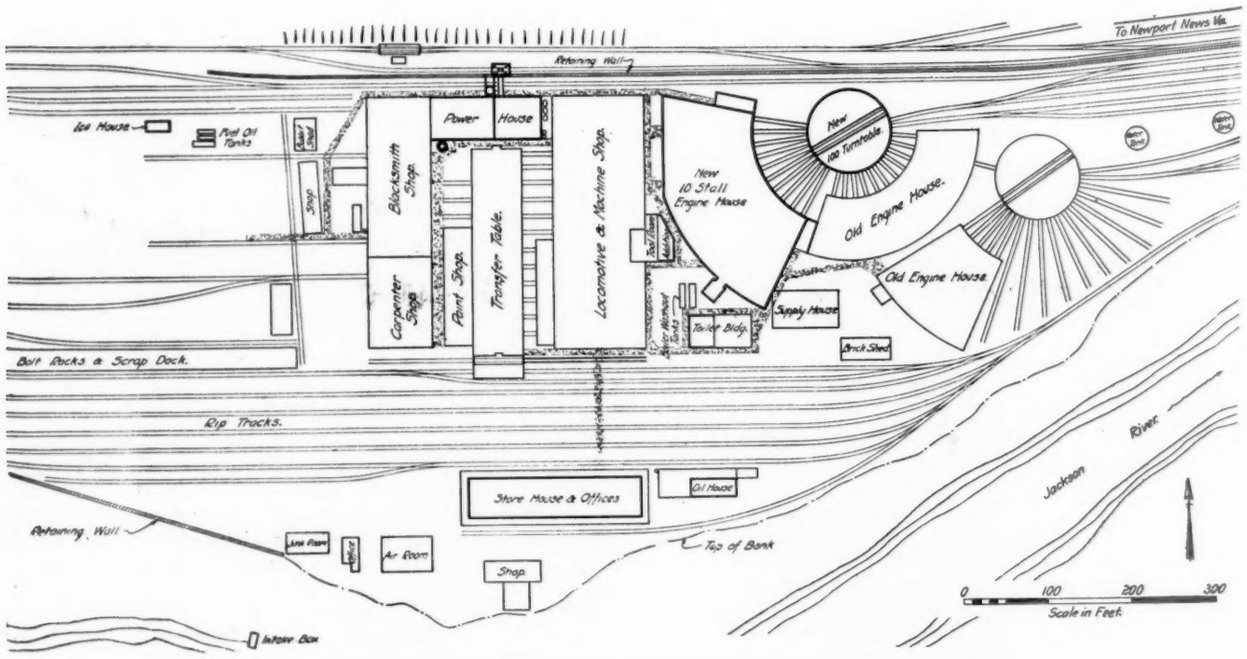
Two "transits" smoke jacks are installed over the front end of each engine pit with a third jack over the two pits



Ample Provision for Smoke Jacks Was Made in the Roundhouse

intersected by the drop pits, to take care of the smoke, when engines are spotted over the truck wheel drop pits. A monorail track extends around the outer wall of the building. This track is, in general, placed 10 ft. from the outer wall and extends out of the building across a 20-ft. passageway

pressed air outlets are placed between all pits, on two rows of columns, one near the center of the building and the other near the outside walls. Steam blower outlets, fitted with extended drop pipes and Barco flexible connections, have been placed between each of the engine pits at the most convenient points for connecting to the engine blowers. The boiler washing pumps and heater are located in a room adjacent to the rear of the building, which opens directly into the roundhouse, the storage and settling tanks being located adjacent outside the building. The roundhouse is provided with a room 16 ft. wide by 49 ft. long, on the north side of



The New Facilities Were Added to the Best Advantage in the Space Available

and into the machine shop, making it possible to convey air pumps, rods and links and other heavy parts directly from any stall in the roundhouse to the machine shop, and vice versa. A two-ton electrically-operated, hand-controlled traveling monorail hoist operates on this track.

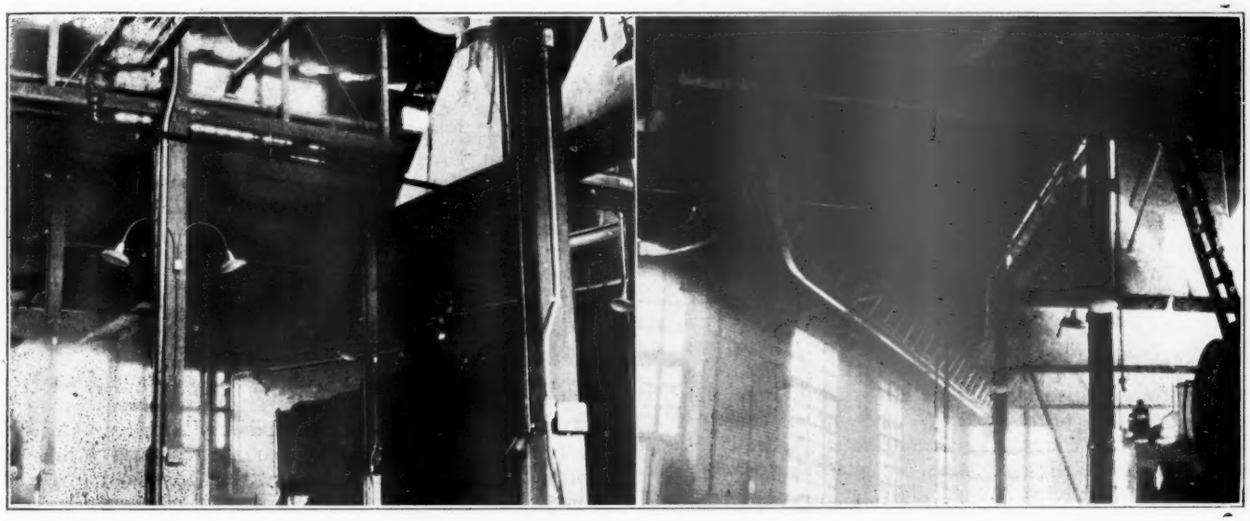
The house is supplied with a 4-in. cold water filling line, with valved outlets between each two engine pits. Com-

the building, to afford space for lockers, lavatories and toilet facilities for employees of the roundhouse.

Heat is furnished to the building by an indirect system through underground conduits by an American Blower steam engine-driven fan. This apparatus, together with the vento-heater, is located in one corner of an adjacent remodeled building, which is arranged to house the heating apparatus

for the roundhouse, together with toilet and lavatory facilities for both the colored and white employees in the machine and blacksmith shop. There are also 217 steel lockers in this building. All of the lavatories are supplied with hot and cold water, and the plumbing is modern throughout.

A new 100-ft. twin-span turntable, of the type recently developed by the Bethlehem Steel Bridge Corporation, of Bethlehem, Pa., has been installed by the railroad in a heavy concrete turntable pit. This turntable serves the new roundhouse, together with that portion of the old roundhouse which has not yet been rehabilitated.

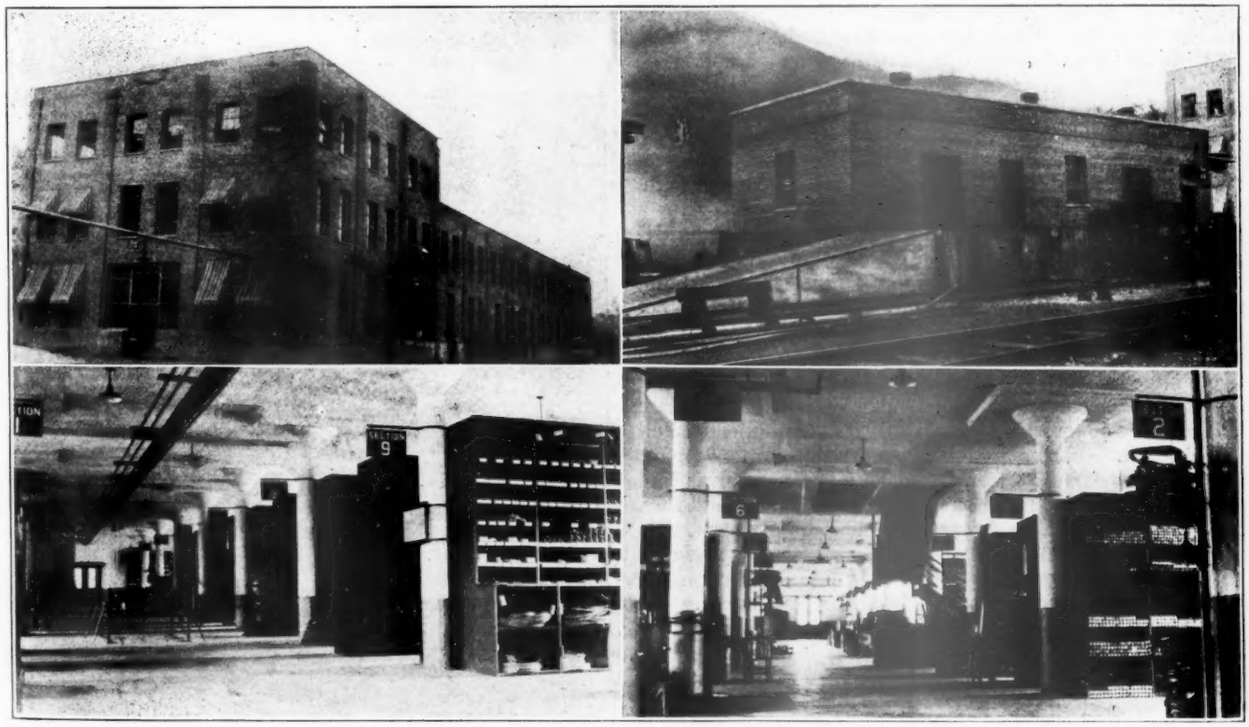


Two Interior Views of the Roundhouse. Monorail Shown at the Right

A Centrally Located Power House

The most desirable spot for the power plant was naturally one that would be central with respect to the distribution of steam, compressed air and electric current and accessible for coal supply and ash removal. An unoccupied location to fit this specification was not to be had, so it was decided to remove the pipe and tin shop building to make room for the power house. The location is shown in the map. Here advantage could be taken of the excellent situation of an existing track, elevated 12 ft. above the boiler room floor, which afforded an unusual opportunity to construct a coal unloading and receiving hopper, without the need of a deep excavation.

The power-house building is 134 ft. long by 52 ft. wide. A length of 76 ft. 6 in. at one end is used for the boiler room while the remainder of the building, 57 ft. 6 in., serves as the air-compressor room. The building is of concrete, brick and steel construction throughout and has a concrete tile slab



Upper Left—The Storehouse. Upper Right—The Oil House. Below—Two Interior Views of the Storehouse

roof deck, covered with four-ply pitch and gravel roofing. Reinforced concrete overhead coal bunkers provide storage capacity for 200 tons of coal within the building.

The boiler equipment consists of two 200-hp. and three 350-hp. Sterling water tube boilers, making a total capacity of 1,100 hp. These boilers are fitted with Detroit Murphy type stokers. Draft is provided by a Heinecke radial brick chimney, 8 ft. inside diameter, 175 ft. high.

The furnaces are fitted with Blonck efficiency draft meters. A new Cochrane boiler feedwater heater of 1,666 hp. capacity, together with two 10-in. by 6-in. by 12-in. Deane horizontal duplex outside packed, plunger type boiler feed pumps are installed at the rear of the boilers. An 8-in. by 10-in. by 10-in. American Marsh vacuum pump is installed in connection with the shop heating system.

The coal and ash elevators and conveyors were furnished by the Ogle Construction Company, Chicago, and the coal crusher by the Stephens-Adamson Company. The coal for the plant is dumped from drop-bottom cars into the track hopper and then elevated by an automatic electric inclined bucket skip-hoist, to a crusher, placed above the coal bunkers in the plant. From the crusher the fuel is carried on a belt conveyor which distributes it to the bunkers, from which it is fed by gravity to the stokers. Ashes, when removed from the ash pits, are elevated by an automatic electric skip-hoist and stored in an elevated steel, concrete-lined ash bin and discharged by gravity into standard gage cars, spotted on the track below it.

The compressor room houses two air compressors, of 888 cu. ft. capacity each, driven by individual motors, one 1,700 cu. ft. steam-driven air compressor, one 150-kw. motor-generator set and one 800-ampere, 75-volt motor-generator welding set together with the switchboard, which controls the motor-driven units in the compressing room and the distribution of low tension current throughout the shops.

Adjacent to and just outside of the compressor room are three 350-kv.a. transformers and two steel air reservoirs.

The Storehouse

The greater portion of the power plant equipment was moved from the old power house, located adjacent to and west of the machine shop. The old house had to be partially taken down to make room for the new roundhouse. The moving of all of this equipment was accomplished satisfactorily, without interruption to the daily operation of the terminal or shops.

The new storehouse is a reinforced concrete building, 209 ft. 6 in. long by 49 ft. 6 in. wide, two stories high, with a space 48 ft. square, provided on the third floor for a drafting and file room and the apprentice instruction department. On the first floor, at the east end of this building, are the offices for the time-keeper and storekeeper and on the second floor the master mechanic's office, together with spacious offices for his clerks, the road foreman and general storekeeper. The building is located at the south edge of the property, the natural contour of the site here sloping towards the river. This made it possible to place the first floor of the storehouse level with the shop floor and eliminate the usual ramp leading to the platform in most railroad storehouses. A standard-gage material track is laid parallel with the platform on the south side of the building, this track being on a level four feet below the platform, thus bringing the platform level with the floor of cars spotted on this track.

The first and second floors of the storehouse proper are furnished with steel material racks and steel shelving. A two-ton electric freight elevator is being installed to serve the second floor. The building is equipped with steam heat and electric light throughout and the building and equipment represent the best in construction and equipment that is now used in railroad shop warehouses.

The Oil House

The oil house is a reinforced concrete, fire-proof building, 34 ft. 2 in. wide by 60 ft. 2 in. long, with an oil delivery room on the first floor and oil tank storage room in the basement. The basement is furnished with five 8,000-gal. steel oil storage tanks and one 1,600-gal. tank. Self-measuring, hand-operated oil pumps control the distribution of oil from these tanks, the pumps being located in the oil delivery room. A fire-proof waste storage room, having a capacity of a carload of waste, is constructed at one end of the first floor. The remainder of the first floor is utilized for the storage of oil and paint in barrels and is further supplied with a battery of five 110-gal. and one 320-gal. rectangular, steel storage tanks, with self-measuring pumps. Suitable pipe terminals, with valved outlets, are provided underneath the edge of the platform for making connections to tank cars so that oil can be unloaded by gravity directly from tank cars to the storage tanks in the basement.

Water for the shop service system and engine supply is taken from the Clifton Forge water mains and also from a gravity line, recently laid to the city reservoir. The power house contains two auxiliary motor-driven pumps for taking water from the Jackson river, in case of emergency.

The new buildings are all abundantly supplied with electric lighting fixtures, all of which are equipped with steel, enameled reflectors. The main wiring for the roundhouse lighting is carried on brackets around the outside wall. From these mains, branches extend in conduits through and down the wall and underneath the floor to the building columns, where they are brought up to the lighting fixtures supported on these columns. Ralco plug receptacles placed three between each of the engine pits, supply extension cord lights in the pits or elsewhere, when required.

The layout, including the design and preparation of the plans and specifications for all of the new buildings and equipment, was made by the Arnold Company, Chicago, cooperating with the motive power department of the railroad, under the direction of J. R. Gould, superintendent of motive power. The construction was carried out by the Arnold Company, under the supervision of C. W. Johns, engineer of construction for the Chesapeake & Ohio.

Entrance to the Connaught Tunnel, C. P. R.

Further Testimony Before Senate Committee

Julius Kruttschnitt Replies to Former Director-General and W. J. Lauck Assails Railroad Financial Management

WASHINGTON, D. C.

JULIUS KRUTTSCHNITT, chairman of the board of the Southern Pacific, in continuing his testimony on April 12 before the Senate interstate commerce committee charged that the Railroad Administration respected neither the promise of the President nor the guarantee of Congress to maintain the railroads in as good repair and in as complete equipment as when taken over on January 1, 1918. He also said that it is "a just cause of complaint against the director general that he refused to recognize the moral obligation he was under to make an increase in the carriers' revenues corresponding to the enormous and destructive burden of expenses he had placed on them."

"He left to the owners," said Mr. Kruttschnitt, "the unpopular task of seeking before the public an increase of revenue to meet this increase of expenses. It was easy to shift this burden to the carriers, which at the threshold of resuming their relations with the public were confronted with a necessity of asking a large increase in rates. In equity this obligation was not theirs. It was the obligation of those who had created the necessity.

"What do investors in railroad securities think of the degrees of the respect paid by the director general to the President's assurance 'that their rights and interests will be as scrupulously looked after as they would be by the directors of the several railway systems' when he returned their properties with a margin of but 6.53 per cent between operating expenses and earnings compared with 29.52 per cent when he received them."

Mr. Kruttschnitt said that the statistics compiled by the Interstate Commerce Commission show that the director general skimped in the use of both ties and rails.

"In two years cross-tie renewals," he said, "were 32,628,360 short—enough to lay 11,500 miles of track or about 3½ tracks stretching from New York to San Francisco. Rail renewals were cut 440,230 tons—enough to lay 3,120 miles or a track from New York to San Francisco. There was also a shortage of 1,816,155 cubic yards of ballast used in repairs.

"Mr. McAdoo tries to convince himself that it was not his duty to put into the track an average number of ties annually, determined by the test-period average, in order to fulfill the obligations of the government to return the properties in substantially as good repair as they were on January 1, 1918. If the federal administration has discovered a way to maintain a track for two years on a 28 per cent reduction annually from the number normally used, it has discovered something of inestimable value to maintenance engineers."

Ties Skimped and Repairs Neglected

The effect of skimping ties and neglect of car repairs on derailments was shown strikingly in a chart which Mr. Kruttschnitt had prepared for all Class I roads. Derailments rose rapidly from 5.26 in 1917 to 12.34 in 1920 per million locomotive miles run, or 135 per cent higher in the latter than in the former years. There was an increase of derailments on the Louisiana and Texas Lines of the Southern Pacific from 4.37 per million locomotive miles in 1917 to 13.57 in 1920, or 211 per cent, confirming the assertion that these lines were conspicuously neglected by the federal directors general and in many places were dangerous. Mr. Kruttschnitt also presented photographs of track and car conditions in 1920 after the return to the owners.

"The low total number of derailments due to defective equipment and permanent way in 1917, 1916 and 1915, both on all Class I roads and on Southern Pacific Lines in Texas and Louisiana, and the rapid decline from the peaks of 1920—all based on the records of the Interstate Commerce Commission—afford the strongest possible confirmation of the repeated assertions of the carriers," he said, "that the roads and their equipment were in safe and satisfactory physical condition when taken over by the government at the end of 1917, disprove conclusively Mr. McAdoo's assertion that the railroads were broken down physical wrecks, and show clearly by the great increase in accidents that depreciation under federal control was rapid and excessive and mainenance as to both track and equipment was neglected to such an extent as to be absolutely unsafe and in a condition (convincingly proved by government statistics) far below that required by the president's promise and the contracts entered into with the carriers.

As to Traffic Volume

"Mr. McAdoo asserts that the handling of the greatest volume of traffic on record in 1920 disproves the charges of the carriers that their properties were returned in March, 1920, in deplorable condition—much worse physically than when turned over in January, 1918. We assert with equal force that handling by the federal administration the largest volume of tonnage in 1918 ever moved up to that time disproves Mr. McAdoo's charge that the railroads were broken down and the equipment in wretched condition when he took them over.

The truth is, the federal administration *worked* the track and equipment received on January 1, 1918, so as to make them handle the record-breaking traffic of 1918, but did so at the expense of their physical condition; as shown by records, the percentage of bad-order freight cars rose from 5.1 per cent in January, 1918, to 7.0 per cent in March, 1920—an increase of 37 per cent. Private management pursued the same course to handle the record traffic of 1920 and the number of bad-order freight cars arose from 7.0 per cent in March, 1920, to 8.7 per cent in January, 1921—an increase of 24 per cent. In both cases the work was forced by high pressure out of the properties at the expense of its condition *with this vital difference, however*: that the federal administration got the increased service out of equipment by increasing the number of bad orders by 37 per cent *at the expense of the owners,* notwithstanding it was obligated by contract and the promise of the president, to bear it; whereas the expense of repairing the 24 per cent increase of bad-orders after the restoration of private control fell on the owners, where it belonged. The further increase of bad-orders from 8.7 per cent, January 1, 1921, to 15.4 per cent in September, 1921, being due to neglect in restoring cars to the owning lines from all over the United States, the expense of relocation and making good the deterioration during relocation, although incurred long after the return to private operation, is directly chargeable to the Railroad Administration, which caused it, and in common justice should be paid by it. All admit it was necessary as a war measure to use cars regardless of ownership, but it was grossly negligent and a flagrant breach of contract *not to keep them in repair.*

The government received about 45.5 per cent of home cars on home roads and returned only 21.9 per cent of home cars on home roads, leaving the owners to get the balance back at their own expense as best they could.

The record-breaking traffic of 1917, 1918 and 1920 was handled with substantially the same number of equipment

units provided by private management, the number of locomotives alone showing a slight increase. While the data relates to equipment solely, the same is true as to general improvements: they were the same substantially in all the years covered by the statement.

Notwithstanding Mr. McAdoo asserts in many places the inadequacy of equipment and its wretched condition, the average number of locomotives and freight and passenger cars ordered in the years 1918 and 1919 of federal control, when Mr. McAdoo says the need was most pressing, was the smallest of any two years in railroad history.

Citing the maintenance instructions issued by the Railroad Administration in 1919, Mr. Kruttschnitt said: "The condition of the railroads when received by the government was the result of maintenance policies followed before and during the test period ended June 30, 1917, when maintenance policies could not be influenced by knowledge that the government would take the properties over, therefore, the owners are clear of suspicion of having unduly highly maintained their properties in order to impose on the government a higher standard than called for by normal conditions. It was no concern of the federal administration whether an unusual amount of replacement or repair work of a character not usually spread evenly from year to year had been done during the test period; nor was it any concern of the government, under the President's pledge, whether the condition of the carriers had been sub-normal prior to 1915 and had been restored to normal in the test period; nor was it its concern whether in the test years improvement programs had been followed which involved unusual charges to operation; nor whether heavy retirements were made during the test period that might not have been found necessary during government control; nor whether unusual expenditures were incurred in the test period incidental to raising the standard or character of a railroad from a lower to a higher class; but it *was the sole concern of the government and its bounden duty under the solemn promise of the President and under the contracts made with the director general to return the properties in the condition in which it received them on January* 1, 1918. Recalling how the railroads were taken over by the President over night, it is evident that the condition of the railroads on January 1, 1918, cannot remotely be attributed to the intention of the carriers to make their roads appear much better than they normally were for the purpose of obliging the government to maintain them to an abnormally high standard.

Citing the Louisiana and Texas lines of the Southern Pacific system specifically, Mr. Kruttschnitt charged that tie replacement made during federal control on those lines were inadequate both in quantity and quality and that "hundreds of thousands of low grade ties were used in violation of the President's promise and contract obligation." He said Mr. McAdoo had sought to prove the incorrectness of these statements by giving replacement figures for the entire Southern Pacific system.

"The damage to the railroad property," he said, "is continuing until the inferior ties are removed but as long as they remain in the tracks the maintenance expense is increased largely over what it should be under the company's specifications."

"Out of every dollar of expense for 1920 for the railroads of the country, 82½ cents was paid out at prices directly fixed by the government itself," he said. "Materials and supplies used during the last 10 months of 1920 costing 15 cents out of every dollar were purchased by the carriers at prices fixed by general market conditions beyond their power to control. In other words prices fixed by the government or by market conditions covered 97½ cents out of every dollar of operating expenses.

"The baneful effects of government practices necessarily continued after the return of the properties and notwithstanding strenuous efforts to correct them are still responsible for the unsatisfactory condition of the railroads.

"The effect of government control of labor costs which began with the passage of the Adamson Act in 1916 has been to yield to labor under the operation of Class I railroads of the United States $3,698,216,000 and to the railroads $21,661,782 net operating income in 1920 or in the proportion of over 170 times as much to labor as to the railroads.

"We admit that increases in the wages of railroad employees were necessary to keep them on a parity with wages in outside industries due to war conditions, but we deny emphatically that railroad employees were underpaid to such an extent when the government took control as asserted by Messrs. McAdoo and Hines as to justify the unreasonable increases which they authorized."

U. S. R. A. Did Not Return Railroads Self-Sustaining, Says Senator Cummins

"I think the most serious complaint that can be made of the Railroad Administration lies in the fact that it did not return the railroads to their owners self-sustaining," said Senator Cummins at the conclusion today of the testimony. "It ought to have established rates before the railroads were returned that would make the railroads reasonably self-sustaining. The failure to do that not only imposed upon the railroads a most unpopular, and I think unnecessary duty, or at least necessity, but it imposed upon Congress the requirement to make the guarantee running from March 1, 1920 to September 1, 1920.

"If the Railroad Administration—in anticipation of the increase in wages which it knew would come about, and in consideration of the existing fact that the rates were not even then maintaining the properties—had increased the rates as it should have done, the railroads at least would not have inherited that very disagreeable performance and the guarantee that the government has to bear now for the six months would not have drawn upon the Treasury as it had drawn and as it must continue to draw.

"I feel that there is a very just complaint against the Railroad Administration in that regard, far beyond any other controversy that it may have with the railroads. It was just as much the duty of the government to return these roads with rates that would sustain them in their operations as it was its duty to return them in as good condition physically as it took them. And that is a matter that has not been sufficiently understood by the people of the country. I think when it is fully understood, that very much of the criticism that has fallen upon the railroads since that time will disappear."

"I had the same thing in mind when I called attention to the fact that they increased expenses and made no attempt to increase the revenues during the first five months of 1918," said Senator Pomerene of Ohio.

"The roads made repeated requests on Director General Hines in the last half of 1919 to increase the rates," said Mr. Kruttschnitt, "but he kept saying, 'wait, wait, things will probably improve; prices may fall and you will be better off,' and it was finally delayed until it was not done at all."

Lauck Praises Mechanical and Operating Officers

Responsibility for the "present plight" of the railroads was placed upon the financial rather than the operating end of railroad management by W. J. Lauck, who testified on April 17 before the Senate committee on interstate commerce as the consulting economist of the Railway Employees' Department of the American Federation of Labor.

"Their properties are depleted," said Mr. Lauck, "their efficiency is seriously impaired, their credit is undermined, their profits are dwindling, it is hopeless to ask for higher rates, because the traffic cannot stand higher rates, and, caught in this impasse, they find themselves between the horns of

government control or bankruptcy. And this situation has largely arisen because the railroads have been dominated by men who knew how to manipulate stocks and bonds, rather than by men who knew how to carry on the service of transportation on the basis of a maximum of load for a minimum of energy."

"We realize that freight and passenger charges may be too high," said Mr. Lauck, "but we do not concede that it arises from wages paid to railway employees. We acknowledge that labor costs of the operation of the railroads are excessive, but this is due to the delinquencies of railway management and policy, and not to unreasonable wages, working standards, or inefficiencies of railway employees. We will even admit that too much has been paid for labor as a whole, and that, while the individual employee's rates of pay have not been sufficient, labor costs of operation have been too great. This has not been due, however, to any lack of productive efficiency of railway workers, but to the inadequate and impaired facilities of the railroads which are acknowledged even by railroad officials to be a generation behind the commercial and industrial requirements of the nation."

Mr. Lauck explained that he did not bring charges of wastefulness and extravagance against present railway executives, who, he said, are struggling under a handicap they cannot overcome, but against those who made and directed the financial policy of the railroads. The operating and mechanical officers, he said, are "geniuses who have efficiently, honestly and unselfishly devoted themselves to the service, and whom," he said, "we have accorded unstinted praise."

Failure to set aside a sufficient percentage of their earnings to cover depreciation was one of the counts in Mr. Lauck's indictment. He submitted a table purporting to show that in the eight years from 1911 to 1918 the depreciation fund of the railroads was $2,155,500,000 less than it should have been and said that if this money had been set aside and expended properly an annual saving of approximately $800,000,000 in operating expenses would have been effected.

Mr. Lauck said the railroad executives look upon labor simply as an item of operating costs and the first to be attacked when economies and retrenchment are necessary. The workers, on the other hand, regard labor as essentially a human factor in the operation of the roads and insist that wage reductions should not be considered until every other measure has been taken to reduce operating costs.

A Living Wage Basis

Mr. Lauck went into a detailed discussion of the wages of railway workers and said that they should be determined upon a living wage basis, with differentials for skill, experience, hazards of employment and productive efficiency. Senator Cummins said he agreed with him in this; that a government body could adopt no lesser standard as "just and reasonable." To arrive at what constitutes a living wage Mr. Lauck cited the various so-called "comfort budgets" and said that on the basis of living costs in May, 1921, they averaged $1,970. As against this he computed the average annual compensation of railway workers in 1920, as corrected by deducting overtime on the basis of figures presented by the railroads, to have been $1,603.36, further reduced to $1,475.89 by the decision of the Railroad Labor Board effective July 1, 1921.

Large numbers of railroad workers fall far short of any such earnings, however, according to Mr. Lauck. Section men to the number of 275,352 can only earn $925.32 annually under the present scale, if they work full time; construction gang and work train employees, numbering 28,760, can average but $970.08 annually; other unskilled labor numbering 108,977 can average but $1,000.68, and 22,572 crossing flagmen and gatemen can earn only $810.84.

"Here," said Mr. Lauck, "is a total of over 430,000 employees, about one-quarter of all railroad employees, whose average earnings run between $810 and $1,000 per year, and for the largest group—section men—average only $925 per year. Moreover, the earning of these amounts per year depends on absolutely continuous employment.

Instead of seeking further to reduce the wages of men now inadequately paid Mr. Lauck said the railroad executives should at least first make some effort to economize on their outlays for fuel, supplies and equipment, a conservative estimate of the possible annual saving in that direction being one billion dollars, on the basis of 1920 prices.

"There never has been and is not now any public protest on the part of railway management against excessive prices for steel rails, coal, or other materials and supplies," said Mr. Lauck. "Although in 1920 their fuel bill at prices then prevailing was $700,000,000, and their cost of supplies and materials was $2,000,000,000, there was no protest. The indefensible prices of materials, fuel and supplies were accepted, but a most determined drive was made in 1921, and has been growing in strength ever since, to reduce railroad wages.

"This seemingly inconsistent attitude on the part of the railroad executives would be inexplicable were it not for the results of official and private investigations as to the control of credit in this country, and the relations between large producers of fuel, iron and steel and other basic railroad materials, and certain groups of private banking houses and financial institutions. It has been shown that the control of railroads, manufacturing and mining finance and credit centers in a small inner group of New York bankers and financiers of which the banking house of J. P. Morgan & Co. is the apex. This group controls and directs the Association of Railway Executives and through the members of this organization gives expression to its public policies and propaganda."

Billions Needed, Says Lauck

Additional capital to the amount of at least four billions of dollars must be provided for the railroads of the United States if the nation's transportation problem is to be solved, according to Mr. Lauck. "The transportation industry requires a major operation and further palliatives will only accentuate its deplorable conditions," he said. "It should be financed and placed on a proper basis. In order to develop co-operation between employees and management, practical measures should be formulated to give to the railway workers proper participation in all branches of management. Friction and controversy between management and employees should be supplanted by team work and united effort. The experience of the Railroad Administration furnishes concrete demonstration of what splendid achievements can be obtained from such a policy. If our fundamental suggestions are accepted by the committee we are sure that better and more efficient transportation facilities will be provided, operating costs greatly reduced, freight and passenger rates decreased with net gains in operating income, and a larger measure of peace and co-operative effort between management and employees will prevail in the transportation industry."

In estimating the new capital outlays required by the railroads Mr. Lauck divided the amounts under two headings, (1) The capital necessary to bring the properties up to a par standard, which should have been taken care of by depreciation reserves, and (2) The capital needed to meet increased traffic requirements. Under the first heading the items were as follows: Locomotives, $500,000,000; track and yard facilities, $224,200,000; bridges and grade revisions, $26,700,000; signal equipment, $82,000,000; freight and passenger stations, $300,000,000; miscellaneous properties, $25,000,000; total, $1,822,900,000.

Under the second heading the items were: 5,000 new locomotives, $265,000,000; 300,000 new freight cars and 6,000

new passenger cars, $882,000,000; locomotive terminals and repair shops, $100,000,000; 15,000 miles of new main track, $600,000,000; signal equipment, $61,500,000; re-location of terminals, $200,000,000; miscellaneous properties, $100,000,000; total, $2,748,500,000.

The grand total of all items of estimated new capital requirements was $4,571,400,000.

"We do not agree with the railroad executives that this requisite capital is practically unobtainable," said Mr. Lauck. "We believe that it is the duty of the banking group which controls the railroads to produce this required credit or capital, that it is practically possible for them to do so, and that they should be required to do so as a condition of their continued control of the transportation system. "We estimate that if all possible improvements and economies were adopted, and if all the necessary capital and credit were available to the railroads to remedy their inadequate facilities, and to install economy devices and methods, an annual savings in operating costs could be made amounting to more than two billions of dollars, or, to be exact, $2,026,000,000, or approximately 40 per cent of the operating expenses of Class One railroads for 1920. Of this amount of possible annual savings, approximately $1,137,508,000 is dependent on new capital outlays. The remainder is based on changes in operating methods or on the introduction of new processes and methods and on unified control.

"The immense saving which could be realized from a conservative plan for properly financing the railroads ($1,137,508,000) would alone reduce total operating expenses at least one-fourth, and constitutes more than one-third of the total outlay for railroad labor. In other words, it would be equivalent to the savings in operating costs if the earnings of railroad employees were further reduced approximately 33⅓ per cent. It would be an amount sufficient to pay the 6 per cent guarantee on the $18,900,000 valuation placed on the railroads by the Interstate Commerce Commission.

"If a broad, scientific and honest policy were outlined by the banking interests who control the railroads, setting forth what savings might be made and what returns might be expected, there can be no doubt that the required amount of new capital would be quickly absorbed by the investing public. So far the bankers have refused to adopt this policy because there is a more profitable field immediately for new capital in other branches of industry, and it is easier and more profitable to take advantage of this and at the same time deflate general labor costs and require the employees and the public ultimately to pay the costs of railroad rehabilitation.

"If the banking combine which controls the railroads will not accept this new policy as a condition of the continuance of their control, then adequate railroad financing should be done under public auspices."

Objections to Contracting Out Work

Mr. Lauck also referred to the petition which he had filed with the Interstate Commerce Commission as counsel for the International Association of Machinists, asking it to prohibit railroads from contracting out repair and maintenance work without its permission. He said that many of the railroads are following the practice of telling their men that unless they will accept lower wages they will "farm" the work out and that this practice is running through all branches of railroad labor except transportation service. If allowed to continue, he said, it will emasculate the transportation act and deprive the labor board of jurisdiction over a million and a half men. He said that while the Interstate Commerce Commission had practically substantiated the charges made by the unions regarding the locomotive repair contracts, the commission had done nothing about it except express an opinion, but if the commission should not have authority to issue such orders, the only way to prevent the practice would be to amend the law to provide specifically that the men engaged on railroad work of this kind are under the jurisdiction of the labor board even if the work is done outside. But, he said, legal opinion seems to be that if locomotives are taken out of service to be repaired they are temporarily not in interstate commerce and, therefore, the men engaged on the work would not be in interstate commerce. Mr. Lauck said that the labor board should not take judicial notice of a reduction of wages made by the United States Steel Corporation, for instance, because it was purely arbitrary and should not be a standard to be followed by a governmental body. He said the railroad representatives would not concede that they are asking for less than a living wage, but they are under great pressure. He also said that the law does not provide specific standards for determining railroad wages, but that if the board does not take the position that it requires an adequate living wage it will become merely a barometer for registering supply and demand. He said the board had accepted the principle of an adequate living wage, but had not yet given it practical effect.

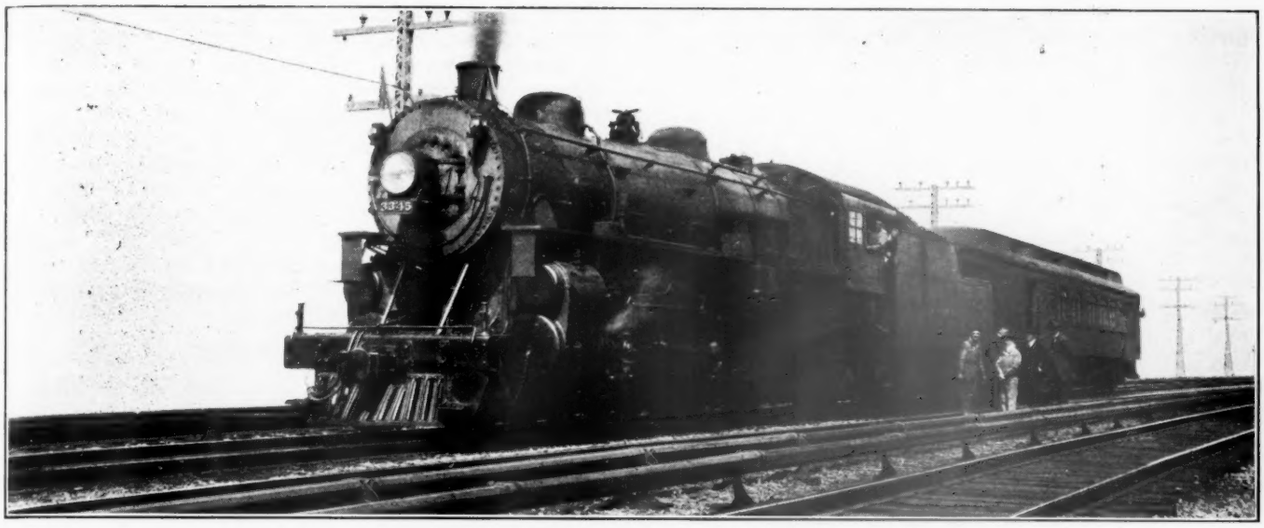
Nature of Mr. Lauck's Testimony

Mr. Lauck's testimony continued for three mornings and consisted largely of repetition of testimony previously given before the Railroad Labor Board. Most of the time only Chairman Cummins and Senator La Follette of the committee were present and on Wednesday Senator La Follette was the only member of the committee present. At the conclusion of Mr. Lauck's statement, Senator La Follette asked him to file for the record a large number of detailed exhibits, to which he had referred, but which he had said were too voluminous to put into the record, and practically gave the witness permission to file such statistical material as he cared to. Mr. Anderson was also given permission to read into the record a large amount of detailed testimony that had been presented before the labor board.

J. F. Anderson, vice-president of the International Association of Machinists, preceded Mr. Lauck, urging that the law be amended to make the formation of boards of adjustment mandatory instead of optional. He said there should be four national boards for the four principal groups or classes of railway employees, saying there would be danger with regional boards of confusion of decisions. He also urged that the law should be changed to prevent railroads from contracting out repair work.

Photo by International

Built by "Rheinmetal" at Its Essen, Germany, Works for the Russian Soviet Government

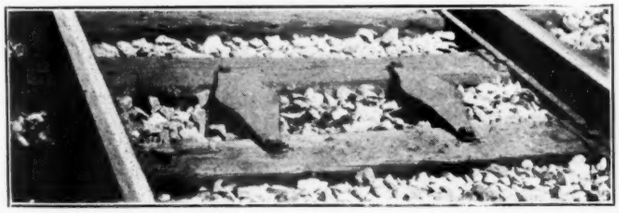


The Train Now Being Used on the New York Central to Test the Train Control System

The Sprague System of Auxiliary Train Control

Apparatus Is Now Undergoing a Series of Daily Tests on a Section of New York Central Track

THE SPRAGUE SYSTEM of auxiliary train control, in the words of Frank J. Sprague, who is responsible for its development, is not an automaton in the place of an engineman, but an auxiliary system of train control which, while fully protecting the train and re-inforcing the engineer's intelligence, leaves him practically undisturbed in the handling of his train so long as he performs his duty.



The Two Pole Pieces of a Brake Application Magnet. The Permanent Magnet Which Connects Them is Underneath the Ballast

All apparatus on the track, as well as on the locomotive, is operated on the normal danger plan. Assuming a train in the block section approaching the block to be protected (which may or may not be occupied by a preceding train) it encounters two normal-danger, brake-application magnets, one near the entrance end and one at the critical point in the block, and there is a differential reset magnet near the exit end.

A Reset Magnet

The brake-application magnets are of the permanent magnet type with neutralizing coils wound on the two ends or pole pieces, while the reset is simply an electro magnet. All of the magnets are controlled by the track circuit relay of the section in advance, the brake applying magnets being normally alive and the reset normally dead.

When a train enters this approach block, and the block ahead is clear, the application magnets are made inactive by the neutralizing coils, thus permitting the magnetically responsive receiver on the locomotive to pass through the space over the magnet poles without being affected. If the advance block is not clear then the application magnets will remain normal, or active, and the magnetic receiver on the locomotive is subject to their influence. The reset magnet then is inert.

The Receiver Under the Forward End of the Tender

The track magnets are enclosed for protection in sealed

manganese steel casings which are supported in the ballast, between adjacent ties, by extension arms resting upon and secured to the ties. The application and reset magnets are placed at right angles to each other in the center of the track, the application magnets being paralled to the ties, and the reset magnets parallel to the rails. This insures proper registration and operation of the apparatus on the locomotive regardless of the direction of motion or heading of the locomotive. The faces of the magnet poles are between four and and five inches lower than the tops of the running rails.

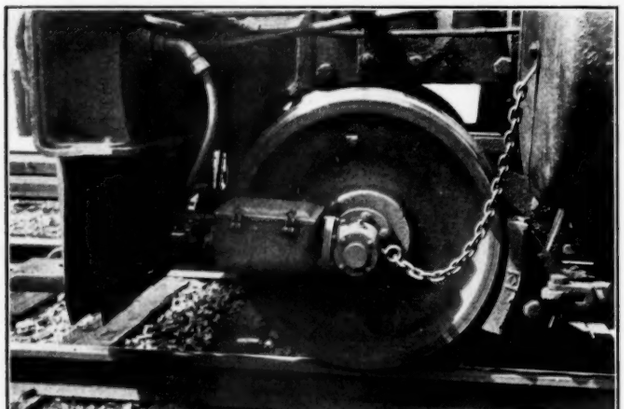
Locomotive Equipment

A double receiver is hung under the forward end of the tender on adjustable supports. This receiver is composed of two pairs of flat iron collector plates attached to the bottom of a non-magnetic box. These plates are from three to four inches higher than the tops of the running rails, thus making the distance from the track magnet to the receiver about seven or eight inches.

The magnetic flux from the track magnet is carried, through movable iron cores within the receiver box, to a floating receiver in which this flux is concentrated on one or the other of two moving armatures of small mass. The application magnets affect one armature while the reset magnets affect the other. The tops of the pole pieces are eight inches in diameter, and when a locomotive is running at a high speed the receiver will pass over the track magnet in less than 1/100th of a second. During this time the small armature in the receiver breaks contact momentarily.

Relays

The momentary breaking of contact by the armature in the receiver is translated into action by relays mounted in a box located on the running board. There are three relays, operating self-centering pressure contacts in definite sequence. These relays will respond to impulses as short as 1/1000th of a second. They are sealed and cushioned, and it is claimed they are unaffected by vibration.



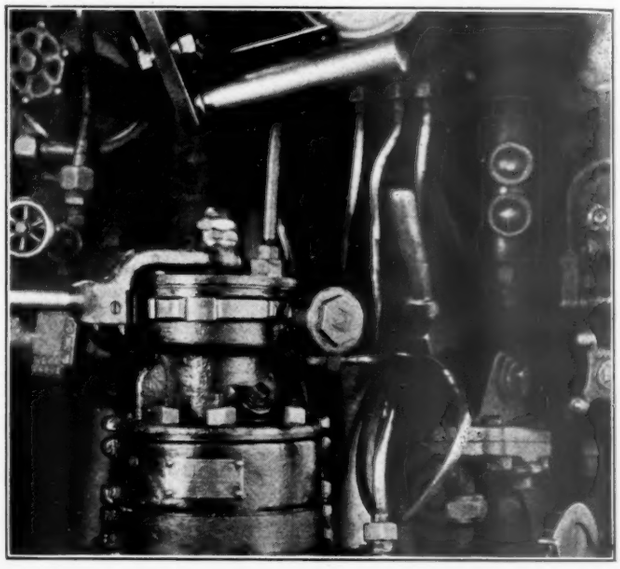
The Speed Control Mechanism

Valve Assembly

The impulses picked up by the receiver and passed on by the relays, result in influencing the action of two pilot control valves located underneath the cab on the fireman's side. The function of these control valves is to establish an opening to atmosphere from one or another of the piston chambers which control the movement of a ported slide valve. The operation of this valve will, as may be determined by a selector valve, effect any required combination of measured and limited light and heavy service and emergency brake applications under speed control, with or without enforced stop if the automatic brakes come on, or with the privilege of proceeding under limited speed until released. The operation of this valve assembly may cover any one of a number of different possibilities, depending upon the conditions of train make-up and of operation met in practice. Under usual conditions of operation, caution and stop signals will cause two brake applications, called primary and secondary. The character of these two applications is governed by the selector valve. Primary and secondary braking may be used in any combination, for example as follows: 10-lb. and 25-lb. reduction; 25-lb. reduction and emergency application; nothing and 25 lb., and so on. The valve assembly is applicable to any kind of standard brake equipment.

Speed Control Mechanism

The speed control mechanism is carried on the front end of the locomotive, one end of it being supported on an extension of the forward truck axle. The other end has a spring-suspended nose support. The drive is by enclosed bevel gearing running in oil, while the governor assembly is carried in a dry chamber in which there is a centrifugal governor, a small air cylinder and fixed and movable end-contact steel brushes.



The Special Head for the Engineman's Brake Valve and One Pair of Signal Lamps

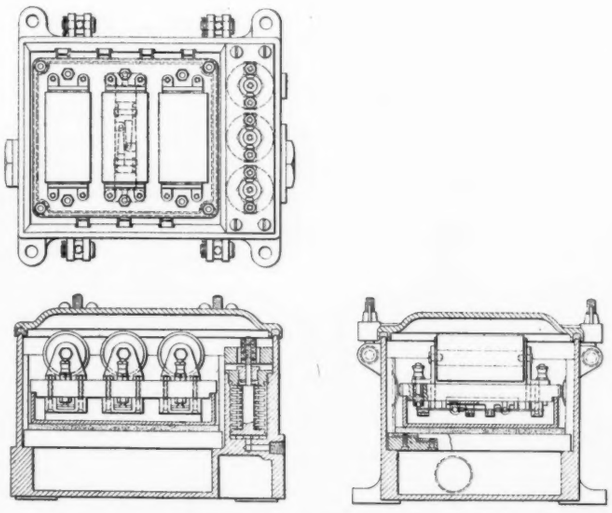
A single flexible air hose and a flexible electric cable, terminating in a standard coupling, are attached to the free end of the speed control mechanism. The air hose is connected to the engine brake system. The whole constitutes a combination of a speed-responsive device (not an odometer) and a brake-responsive device, by means of which the necessary co-ordination may be automatically secured to prevent unnecessary operation of automatic braking.

The remainder of the equipment on the locomotive consists of a small storage battery and the headlight generator for supplying the storage battery; a manually and power-operated engineer's valve interchangeable with the standard valve; and two pairs of signal lamps, one on each side of the cab. The engineer's valve is operated by air-oil pressure when a track impulse is received. This pressure is used to move the handle of the valve to lap position, the actual braking, other than manual, being accomplished by the automatic valves under the left side of the cab. The green lights show when the equipment is in running order and the block ahead is clear, and the yellow ones when the relation between speed and manual braking makes it safe to proceed under control.

Operation

On entrance to every block the cab signals indicate whether or not the next block in advance is occupied. If the signal at the entrance of the advance block is at caution, then, on passing over a live distant magnet, the green light disappears, an audible warning is given and a service brake application is initiated, this being light or heavy, depending upon how the selector valve is set. The yellow proceed light appears if braking is sufficient to forestall secondary braking at the home magnet.

The engineer's brake handle will be moved to lap position, but it can then, with effort, be pushed back to the release position, against the brake-head operating pressure on the motor pistons, which pressure will then be promptly released if the train is not running above the predetermined caution entrance speed. If the engineer is attending to his duty he may, therefore, forestall actual braking of the train or he may promptly release his brakes in response to a change in roadside signal indications. The automatic service brake application may be augmented or diminished manually at will.



Plan and Sections of the Relays and Relay Case

If the selector valve has been set for no primary brake application, as may be required in the movement of slow freights, then only an alarm will be given if the speed is under control.

If the engineer, while approaching the home magnet, makes a service brake application, the yellow light will appear in the cab whenever there is sufficient braking to insure reducing the speed to "control" speed in a suitable distance after passing a live home magnet without automatic secondary braking.

If the danger condition persists when passing the home magnet a second service braking will be initiated, which may likewise be released by the engineer, but conditions are established for an immediate or subsequent secondary brake application, according to the speed and braking conditions which then or thereafter obtain within the block.

If when getting the second impulse at a live home magnet the locomotive is running without braking and below the determined control speed, say 15 or 20 miles an hour, as indicated by the yellow lamp, and so continues until reaching the reset magnet, there will be no secondary brake application, but if the speed is increased and goes above the control speed before passing an active reset magnet, the brakes will be applied.

If the engine when passing a live home magnet is running below the predetermined speed limit, say 45 or 50 miles an hour, and the train as a whole is being properly braked under a manual or automatic service application, the secondary braking will not take place; but if the brakes are released before reaching the control speed, then a heavy service or emergency braking will occur, depending upon the setting of the selector valve. The secondary brake cannot be released, however, until it has completed its function, no matter how short the initial impulse or whatever the engineer attempts to do with his brake handle.

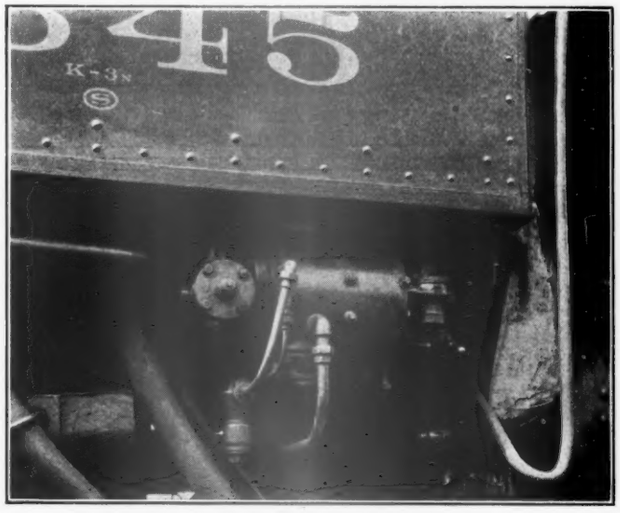
When the speed has been reduced to "control," the brakes may be released, but if the speed is later increased above the low limit before passing an active reset magnet, the secondary or emergency braking will again take place.

If the engine when passing a live home magnet is running above a predetermined high speed limit then there will be an uncontrolled secondary braking which cannot be released until its function has been completed.

When running above a predetermined allowed maximum speed on a clear track, a service brake will come on, regardless of the roadside signal indication, and the train speed must be pulled down to a safe caution block entrance speed to have the pressure on the engineer's brake handle released before passing a reset magnet.

If under these conditions a train, having had a maximum speed brake impulse and not having been pulled down to a suitable speed, should enter a caution block, then it will get a secondary braking at the first application magnet.

If under any conditions the secondary brake has come on, the predetermined set of the selector valve will determine whether the train can proceed under control on the engineer's initiative alone, or whether the train must first be brought to a stop and require the co-operation of the engineer and fireman outside of the cab to release the brakes.



The Valve Assembly

When passing over a live reset magnet the engine relays will be restored to normal position, ready for response to the next live application magnet, no matter whether there have been one or two application impulses received, and if none has been received the reset impulse will have no effect on the apparatus. The reset only restores the control relays to normal; it has no effect on the brakes.

If, however, when passing the reset magnet it is not energized by the clearing of the home signal, the reset will not act and the allowed speed will be held down to the control limit, but the train may proceed into and through the next block under control.

If the conductor unlocks a control switch he can tem-

porarily give to the engineer and fireman the privilege of joint action to establish an early reset, if and only when the proceed cab light is in evidence.

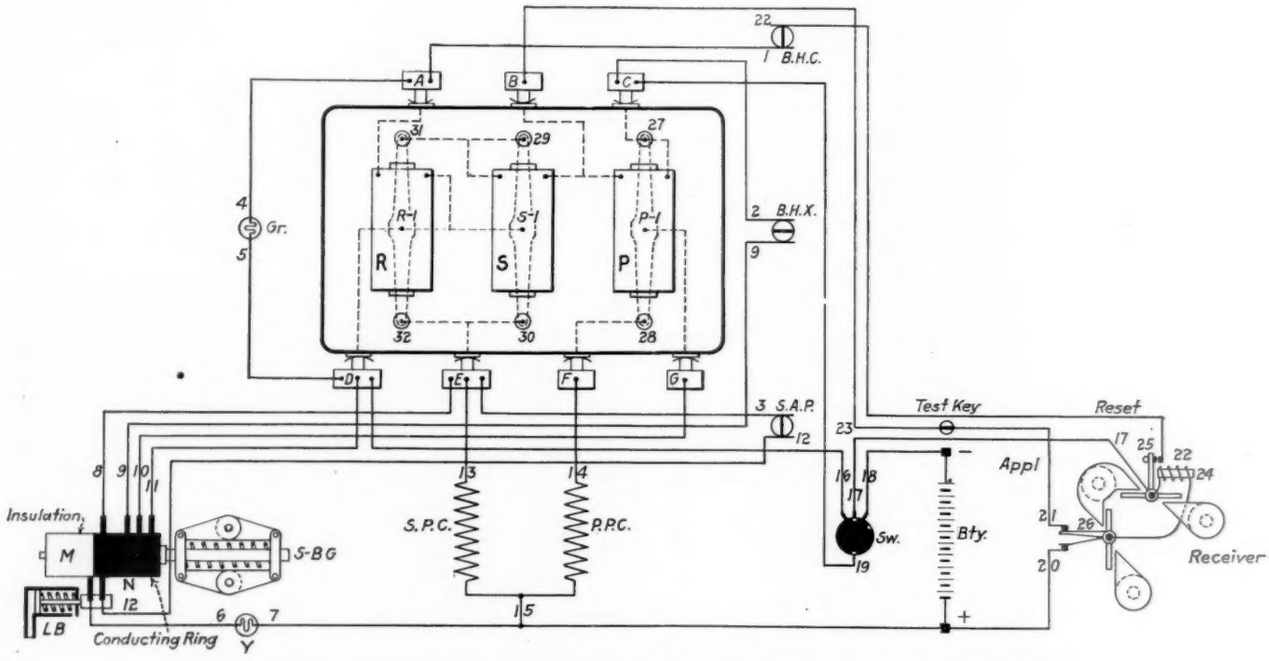
In interlocked or other special territory an additional reset magnet may be installed to permit earlier acceleration in case the signals go to clear, and provision can also be made, subject to the positive control of the train conductor, so that simultaneous co-ordinated action by an engineer and his fireman can reset the relays to normal.

The response to the service brake impulses, and to the secondary brake impulses when exceeding the speed limits, as well as to the resets, is exceedingly rapid, and both brake controls are operated on closed circuits.

Sections under speed control, as for example, dangerous curves or bridge or crossing approaches, may be treated as permanent signal blocks, each being provided with one or more permanent application magnets to initiate service braking at the proper point if the speed is excessive, or later if it is augmented, and a permanent reset magnet after the curve is passed. Portable magnets may also be used for wayside emergency conditions control.

The brakes once applied, the actuating pressure on the brake valve handle persists until the speed is reduced to a predetermined limit, which is individual to each class of locomotive.

All of the electrical connections in the apparatus are shown in the diagram.



A Complete Diagram of the Electrical Circuits and Connections on the Locomotive

Bty ..... Battery.
SW ..... Main switch.
P, S and R..... Primary, secondary and reset relays.
PPC and SPC... Primary and secondary pilot valve coils.
MN ..... Speed-brake controller.
26-25 ..... Application and reset armatures.
Gr and Y..... Green and yellow lights.
BHC and SAP.. Contacts operated by pressure in brake head cylinder and straight air pipe.
BHX ..... Contact operated by absence of pressure in brake head exhaust.

First Impulse

When application contact 21 is momentarily opened, relays P and S are de-energized and drop their armatures P-1 and S-1. The dropping of P-1 opens stick contact 27 and the circuit of the primary pilot valve coil PPC, with resultant primary brake application. The dropping of armature S-1, while opening the stick contact 29, does not then break circuit of relay S because the additional stick contact 31, controlled by armature R-1 of reset R, is still closed. The re-closing of contact 21 immediately energizes relay S and picks up armature S-1.

The application of pressure to the engineer's brake head puts pressure on the BHC switch, opens the reset circuit, breaks green lamp Gr, de-energizes reset relay R, drops armature R-1 and breaks contacts 31 and 32, relay S remaining energized through stick contact 29. There is, therefore, a condition established in which, instead of P, S and R being all active, as in normal running, P and R are opened and S is still alive.

The movement of the brake head pistons opens BHX to atmosphere and closes circuit from relay P through speed brush 9 and cylinder contact N to negative line through brush 11 and switch Sw. This response is permissible only when cylinder contact N, which is normally shifted to the left with increase of speed, is moved sufficiently far to the right to permit brush 9 to make contact with cylinder N. Under these conditions relay P picks up and there is now established these conditions: P and S active and R dead, BHC being meanwhile closed on release of brake head pressure, relay contact 22, however, being left open.

Second Impulse

On second impulse from the track the contact 21 is again momentarily opened and P and S again de-energized, but this time (contact 31 at reset relay R being now open) the dropping of armature S-1 opens the stick contact 29 of relay S, and this relay therefore remains dead, although contact 21 has closed; relay P can be restored as before. The condition of the relays now is: P alive and S and R dead, and two of the four circuits, 8-3-30 and 32, in parallel and connected through 13 to the secondary pilot valve SPC, are opened, leaving the control of SPC through brush 8, on movable brush 12 and the switch operated by SAP.

Brush 12 and brush 6, connected to proceed light Y, are moved to the left by pressure in the locomotive brake system in the same direction as NM is moved by the centrifugal

governor. If SAP is opened then the final control is on brush 8, but if SAP is closed the control is shifted to brush 12, that is, to a co-ordinated position depending upon speed and braking. Contact 6 breaks before contact 12, and hence the yellow light Y becomes a warning and proceed light.

Reset Impulse

On receiving a reset impulse, contact 22 is closed by armature 25 and locked closed by holding coil 24, which is a part of the receiver. Relay R is, therefore, made active; contacts 31 and 32 are closed by R-1 and green lamp Gr is lighted, while S is likewise re-energized and through contact 31 all circuits, relays and pilot valve coils are restored to normal condition. If only one application impulse has been received, the reset contact on the receiver simply restores R and Gr to an active condition, S already being energized.

Tests are now being carried on for seven hours a day, six days a week, on a section of the New York Central, between Ossining and Tarrytown, covering six signal indications on eastbound track No. 2. This is about 30 miles from New York. All other trains are temporarily excluded from this section and several hundred recording operations, under varying conditions, are made each week. Electric locomotives and multiple unit trains which take direct current from a third rail, with a traffic rail return, are operated on this section of the road. The automatic block signal system is normal clear and the rail circuits are alternating current. The normal danger track magnets are supplied from storage batteries located along the right-of-way maintained by a trickling charge from the alternating current power lines.

This train control system was developed by the Sprague Safety Control & Signal Corporation, 421 Canal street, N. Y.

The Relation of Freight Rates to Agriculture

Chairman Anderson of Joint Commission of Agriculture Inquiry Forecasts Commission's Report

Washington, D. C.

Chairman Anderson of the Congressional Joint Commission of Agriculture Inquiry has given out a forecast of the section of the forthcoming report on transportation dealing with the economic relation of transportation to agriculture and industry.

"The joint commission has decided to report to Congress," said Chairman Anderson, "that the transportation rates on many commodities, more especially the products of agriculture, bear a disproportionate relation to the price of such commodities; that immediate reductions in transportation rates should be first applied to farm products and other basic commodities; that reductions in rates upon the articles of higher value, or upon tonnage moving upon so-called 'class rates,' are not warranted while the rates upon agricultural products and other basic commodities remain at their existing levels; that greater consideration should be given in the future by public rate-making authorities and by the railroads in the making of transportation rates to the relative value of commodities and existing and prospective economic conditions.

"It also appears from our inquiry that the pyramided per cent advances in rates authorized by the Interstate Commerce Commission or made by the United States Railroad Administration caused the dislocation of long standing rate relationships between rates upon agricultural and industrial products and between competitive enterprises and competitive sections of the country; also, that the railroads and public rate-making bodies should seek to readjust rates so as to preserve as far as practicable the general relationship existing prior to 1918 with due regard to present and future economic conditions.

"We have found that freight rates on perishables normally take about one-third of the selling price and frequently two-thirds, and in periods of low prices and light demands, they constitute a heavy burden upon this traffic. It is manifest from the evidence we have secured that the purchaser and the farmer are dependent to a marked degree upon the transportation charges of farm products. Regardless of the distance involved these transportation charges must enable both the carrier and the producer to realize a profit from his operations.

"The report will show that in October, 1921, farm products were at an index figure of 102 and railway rates at 169, and that in this period of falling prices for farm products the increased freight charges made the farmer feel more keenly the relationship of freight charges to the price obtained for his product.

"In the opinion of the commission as a whole," Chairman Anderson said, "both the producers and consumers of grain and its products should have the following advantages of transportation:

(a) Competitive avenues of distribution through which the largest number of consumers can reasonably be reached;
(b) Through rates from points of production to points of final consumption through two or more competitive primary grain markets;
(c) General application of the Interstate Commerce Commission's recent conclusion applying lower rates on coarse grain than on wheat, except where rates are affected by water competition or other factors outside the jurisdiction of that Commission;
(d) Adequate and suitable box car equipment.

"Hay," the commission will declare, "must have a reduction in both rates and sales margins before there can be a resumption of normal shipments and in order that the producer may get a reasonable share of the final sales price.

"We are convinced," said the chairman, "that freight rates are still too high to permit the production and marketing of hay at a profit to the producer, and further reductions are essential before the production and marketing of hay will be upon a normal basis. The price of hay on the farm is now at or below the pre-war level, and if that price is maintained both freight rates and marketing costs must likewise be readjusted to a similar level."

The commission has found that livestock shows marked fluctuations in daily, weekly, monthly, and yearly shipments, and it urges that railroads, shippers, and stock yards should co-operate to bring about a more even distribution of shipments at the livestock markets. Increased marketing costs, including freight, commission, and other charges are found to have borne with the greatest severity upon the livestock producer farthest from market.

"Farm prices of livestock in 1921," Chairman Anderson said, "were below the 1913 level. If higher prices cannot be realized, it is obviously necessary that all the cost in marketing and distribution must be stabilized at approximately the 1913 level. If, as now appears to be the case, prices of livestock are going to find their level somewhat higher than in 1913, freight, commission charges, feed, yardage, and other

costs may also find a level corresponding to that of the price of livestock."

Present freight rates have been found by the commission to be but a small percentage of the value of the cotton crop, but it says that they do add to the cotton planter's burden.

"Any increase in freight rates, therefore," said the chairman, "presses with undue severity upon the cotton producer because of the high cost per bale of cotton production. It is pertinent to call attention to the fact that the export of cotton has in the past been the principal factor in balancing the trade of the United States and that it is greatly to the interest of the whole country to have profitable production and large export of cotton continue."

Wool Producers' Low Returns

Figures in the report will show, Chairman Anderson says, that the difference between market prices for wool and the return to the producer plus freight is unduly large. In 1913 the spread varied from $0.17 to $5.74, and in 1920-21 from, low, $3.54½, to, high, $6.28½. The chairman said on this point: "It is difficult to believe that the cost of marketing increased in any such ratio. We believe that the price of wool to the producer has been depressed somewhat by the freight rates but primarily by disorderly and unscientific marketing." The steps taken toward co-operative grading and selling will help to bring the wool producer closer to the consumer.

In dairy products the commission has found that the freight rate has a varying influence upon the return to the producer and the price to the consumer. For the United States the weighted average freight rate on whole milk is probably less than one cent per quart. Since buttermaking changed from a farm industry to a factory production, the transportation charge has entered largely into the price of butter to the producer and consumer. The farmer's price for butter fat is obviously more largely influenced by fluctuations in market prices than by the freight rate. Cheese rates have been found to be on a very high level and out of alignment with rates on more valuable and more perishable commodities such as eggs or grapes.

"Aside from their direct application to the products of agriculture," said Mr. Anderson, "transportation charges have an indirect but important effect on agriculture through their relation to the cost and selling price of the basic commodities. We have gone into the subject from that angle and will be able to present some definite conclusions in our report.

"For example, fertilizer prices are now close to the pre-war basis except for the higher freight costs now prevailing. Material prices and costs of manufacture are almost back to normal, leaving the present freight costs almost entirely responsible for the difference between present cost of fertilizer and that which prevailed prior to the war.

Farm Implements

"We have found that the weighted average of farm implements factory price, exclusive of power of equipment and twine, shows that price to be 41 per cent above 1913; inclusive of power equipment and twine, these prices are now approximately 20 per cent above 1913. It would appear that the factory price of agricultural implements does not show price advances to such a marked degree as other commodities and that they are rapidly receding to a lower price level. In 1914 the transportation charge on agricultural implements was about 11 per cent of the selling price to the farmer, including the freight on raw material entering into the manufacture, and in 1921, same increased to 15 per cent. A reduction in freight rates on each basic commodity, such as pig iron, steel, coal, coke, and lumber, would assist in reducing the farmer's expense for farm implements."

The report will show that the farmers are the second largest consumers of steel, coming next to the railroads, and purchasing annually about 30 per cent of the country's steel production. They are, therefore, intimately interested in the relationship of transportation cost to the sales price of steel. The freight element in a ton of steel is declared by iron and steel makers to be in excess of 41 per cent of the selling price of the finished article and still higher in the case of pig iron.

The farmer is similarly interested in coal freight charges, since he is directly or indirectly concerned in from 20 to 22 per cent of the annual consumption of bituminous coal. Mine prices, freight rates, sales margins on both bituminous and anthracite coal have very greatly increased since 1913. There has been practically no depression in this industry although prices were somewhat lower in 1921 than in 1920. The commission believes that reduction in mine prices, freight, rates, and sales margins on coal, especially on bituminous coal, would probably be promptly reflected in improved business conditions.

As to Coal

With further reference to bituminous coal, Mr. Anderson said that the commission had reached these conclusions:

(a) That the wages of the coal industry should be considered in the light of the prevailing economic conditions;

(b) That the transportation charges should be adjusted with due regard to the prevailing conditions;

(c) That items of immediate expense in handling should be reduced to the lowest possible minimum;

(d) That duplication of any items of expense intermediate between producer and consumer should be eliminated where such expense can be avoided without unnecessary interference with the broad avenue of distribution now existing.

Directly or indirectly, the commission has found that the farmers consume 46 per cent of the country's lumber production, largely in the so-called lower grades, and on these grades the retailer now realizes on the long hauls more in his sales margin on the freight cost than upon the lumber's mill value.

"From the standpoint of the railways as a whole," Chairman Anderson said, "they could better afford to obtain the needed revenue from the lumber business by the assessment of relatively higher rates to apply to their short haul business in order to give needed relief to the long haul traffic and still maintain a total compensatory railroad revenue."

Oil Products

The price of gasoline and kerosene, of which farmers are large consumers, has been found to be influenced little or not at all by changes in freight rates. As to cement, which is in the same category, the commission has found that both freight rates and prices of this commodity should show the trend of price levels of other basic commodities. "When the freight rates are reduced," Mr. Anderson said, "such decrease should be reflected in the price to the consumer and not absorbed as profit by various other factors in the distribution system. We believe that the public constituted authorities might properly analyze retail price trends of this commodity in relationship to the level of rates established."

Canned goods prices have been found to be practically back to pre-war levels. The price and distribution of canned products is not materially affected by present freight rates, the freight rate bearing a relatively small ratio to the final sales price.

Freight rates on such articles as boots, shoes, dry goods, men's and women's clothing, in the commission's judgment, are not materially responsible for the price of these commodities. Where the freight rate is not absorbed by the merchant but is made a part of the cost basis upon which margins and profits are figured, it represents a small proportion of the final sales price.

B. R. & P. Ton-Mileage Reduced 53.92 Per Cent

Result of Sharp Decline in Traffic Is 1921 Deficit of $965,508, Which Equals 5.85 Per Cent on Stock

BITUMINOUS COAL makes up about two-thirds of the total tonnage of the Buffalo, Rochester & Pittsburgh. The tonnage of this commodity in normal years runs about 10,000,000 tons and the total tonnage of all commodities about 15,000,000. In 1921, the Buffalo, Rochester & Pittsburgh carried only 3,854,947 tons of bituminous and its total tonnage was only 7,503,909 tons. The result was a corporate surplus available for dividends shown in red—in other words, a deficit of $965,508, or a return on capital stock figuring out at a loss of 5.85 per cent. These figures compared with a net of $2,295,049 in 1920, amounting to 13.91 per cent on the capital stock. The contrast between 1921 and 1920 is made all the more striking because 1920 was the best year in the company's history and 1921 the poorest for an extended period of time. The past year was the first in which the company experienced a deficit since 1894.

In 1920, the road was unusually fortunate. It did not succeed in doing anything at all spectacular during the last two months of federal control—January and February—nor did it shine particularly during the guaranty period. It did, however, do some rather remarkable work during the last four months of 1920 when it was operating on its own account. It then had the advantage of the increased rates effective in August and it had a heavy traffic movement which lasted well into December. It was its earnings for these four months which enabled the road to show the large corporate net which it did show for 1920—namely 13.91 per cent on the capital stock. The decline in traffic, when it did come, was extremely sharp. Its sharpness was evidenced in the figures for January and was accentuated in the following months. Thus in October, 1920, the net ton-miles, including both revenue and non-revenue freight, were 251,562; in November, 213,321; in December, 197,064; in January, 1921, the figure had dropped to but 115,072 and in February there was a further drop to the low figure of 85,276. Nor was there during 1921 any sign of recovery. The best month in 1921 was October; in that month the net ton-miles totaled only 122,708.

The decline in traffic on the Class I railroads as a whole from 1920 to 1921 was 23.3 per cent. The Buffalo, Rochester & Pittsburgh, however, suffered a loss of 49.78 per cent in revenue tonnage and of 53.92 per cent in revenue ton-miles.

With a decline such as this one, no one could expect any railroad, no matter how efficiently managed—and the Buffalo, Rochester & Pittsburgh is noted for its efficient management—not to suffer a severe loss even with the advantage of higher rates and the most drastic sort of economy.

Extraordinary Unfavorable Conditions in Coal Fields

The road serves what may be generally termed the central Pennsylvania bituminous field, which in 1921 experienced, as President Noonan puts it in his annual report, "extraordinary unfavorable conditions." Bituminous coal, as noted, makes up about two-thirds the total tonnage. The road also has an important tonnage of iron ore, coke and pig iron. In 1921 this latter traffic, like coal, was also conspicuous by its approach to absence. The details may be given briefly as follows: The total tonnage of all commodities carried was 7,503,909 as compared with 14,941,182 tons in 1920, a decrease, as above noted, of 49.78 per cent. The tonnage of bituminous coal was 3,854,947 tons as compared with 9,402,558 in 1920, a decrease of 5,547,611 tons. Coke which totaled in 1921, 154,388 tons was 442,393 tons less than in 1920. The iron ore tonnage was but 99,727 tons, 642,614 tons less than in 1920.

"Other freight" did not suffer as severely; it was 3,300,670 tons in 1921 as compared with 3,954,892 tons in 1920. The tons one mile were 1,136,943,603 as compared with 2,467,398,051 in 1920, a decrease of 1,330,454,448, as above noted, or 53.92 per cent. It is well, in using these 1920 figures, to point out that although the net income of the property in 1920 was the best in the company's history—due to the results of the last four months—the traffic carried in 1920 did not break any records. The revenue ton-mileage was greater in both 1917 and 1918.

Putting these on a revenue basis gives us more interesting details. The freight revenues in 1921 totaled $11,962,147 as compared with $19,014,479 in 1920, a decrease of $7,052,331. The road shows its revenues from coal transportation separately: the 1921 coal revenues were $6,261,050 as against $11,828,281 in 1920, a decrease of $5,567,231. The total revenues, including passenger, etc., totaled in 1921, $14,399,526, or $7,334,198 less than in 1920. As would be natural under the circumstances and as we would expect it to be the case in any report of 1921 operations, there were sharp cuts in operating expenses. The operating expenses were actually $13,917,032 as compared with $21,127,624, a decrease of $7,210,592 from 1920. It seems hardly worth while to go into an analysis of these figures as we have already pointed out the effect of the reduction in tonnage and have shown that the good corporate result for 1920 was the result of the favorable earnings of the past four months of that year.

Cost and Profit per Ton-Mile

The company's annual report gives some unusually interesting figures of cost and profit per ton and per ton-mile. The figures are on an annual basis—in other words, insofar as concerns 1920, the unfavorable conditions of the first eight months of the year are averaged out with the good conditions of the last four months. Thus it is shown that in 1921 the receipts per ton were 159.41 cents as compared with 127.26 cents in 1920. The cost per ton in 1921 was 151.69 cents as against 123.54 in the previous year and the profit per ton was 7.72 cents as against a profit in 1920 of but 3.72 cents, which profits per ton, incidentally compare with a loss in 1919 of 6.08 cents and a profit of 17.75 cents in 1917, or 20.28 cents in 1916. The figures per ton-mile show receipts in 1921 of 1.052 cents; in 1920, .771, and profits in 1921, of .051 cents; in 1920, .023 cents, or in 1917, .104 cents.

Naturally, with the sharp reduction in traffic, the operating statistics do not show favorably. Thus, in 1921, the average revenue train load was 754 as compared with 943 in 1920. The tons per loaded car were 34.50 as against 39.98.

The Buffalo, Rochester & Pittsburgh is an extremely high-grade road financially and physically. It is a well-managed property. It is to be presumed that the poor results of 1921 will not be far-reaching because they have been the result of a single thing—lack of traffic. Of course, conditions at present are disturbed by the coal strike, and in general, the desired improvement in earnings is not in sight. The road, however, is prepared to handle a heavy business and apparently its only problem at present depends upon its getting that business through restoration of normal conditions in the territory which it serves.

Rail Production in 1921

THE PRODUCTION of rails in the United States during 1921 was the lowest in any year since 1914, according to statistics of the American Iron and Steel Institute. The total, 2,178,818 gross tons, is less by 425,298 tons than the production in 1920.

PRODUCTION OF RAILS BY PROCESSES, GROSS TONS

Years	Open hearth	Bessemer	Rerolled*	Electric	Iron	Total
1907	252,704	3,380,025	.....	....	925	3,633,654
1908	571,791	1,349,153	.....	....	71	1,921,015
1909	1,256,674	1,767,171	.....	†	...	3,023,845
1910	1,751,359	1,884,442	.....	†	230	3,636,031
1911	1,676,923	1,053,420	91,751	462	234	2,822,790
1912	2,105,144	1,099,926	119,390	3,455	...	3,327,915
1913	2,527,710	817,591	155,043	2,436	...	3,502,780
1914	1,525,851	323,897	95,169	178	...	1,945,095
1915	1,775,168	326,952	102,083	....	...	2,204,203
1916	2,269,600	440,092	144,826	....	...	2,854,518
1917	2,292,197	533,325	118,639	....	...	2,944,161
1918	1,945,443	494,193	101,256	....	...	2,540,892
1919	1,893,250	214,121	96,422	50	...	2,203,843
1920	2,334,222	142,899	126,698	297	...	2,604,116
1921	2,027,215	55,559	96,039	5	...	2,178,818

*Rerolled from old steel rails. Included with Bessemer and open-hearth steel rails from 1907 to 1910, inclusive.
†Small tonnages rolled in 1909 and 1910, but included with Bessemer and open-hearth rails for these years.

It is interesting to note that there has been a further reduction in the use of Bessemer rail as indicated by the table below. In 1921 only 2.55 per cent of the rail rolled was Bessemer as compared with 5.49 per cent in 1920.

PRODUCTION OF RATES, SHOWING DECREASE BY PROCESSES, 1920-1921

Kinds	1920	Per cent	1921	Per cent	Decrease	Per cent
Open-hearth	2,334,222	89.63	2,027,215	93.04	307,007	13.15
Bessemer	142,899	5.49	55,559	2.55	87,340	61.12
All other	126,995	4.88	96,044	4.41	30,951	24.37
Total	2,604,116	100.00	2,178,818	100.00	425,298	16.33

Girder and high T-rails for electric and street railways are included in the figures given above. For recent years the tonnage was as follows: 1916, 127,410; 1917, 91,674; 1918, 20,834; 1919, 112,712; 1920, 100,910; 1921, 89,162 gross tons. The total production of rails as given above includes, in addition to new rails rolled, rails re-rolled from defective rails and from old rails. The total of renewed or re-rolled rails so included is given in gross tons below.

PRODUCTION OF RENEWED AND RE-ROLLED RAILS, 1914-1921

Re-rolled from new seconds, new defective rails, etc.

Years	Open-hearth	Bessemer	Total	Rolled from old rails	Total re-rolled
1914	13,538	13,234	26,772	95,169	121,941
1915	6,477	2,652	9,129	102,083	111,212
1916	1,711	2,149	3,860	144,826	148,686
1917	1,825	7,182	9,007	118,639	127,646
1918	13,296	19,462	32,758	101,256	134,014
1919	1,933	5,766	7,699	96,422	104,121
1920	19,493	1,979	21,472	126,698	148,170
1921	6,525	702	7,227	96,039	103,266

The tendency toward the use of heavy rail is indicated by the following table showing the production of rails by weight per yard. This shows an increasing preponderance in rails weighing 85 lb. or more. Attention is also called to the fact that rail weighing 100 lb. or over now represent almost the same tonnage as rails weighing 85 lb. and less than 100 lb. As an evidence of the greater use of heavy rail it is also interesting to note that during the past year the tonnage of rails weighing 85 lb. or more represents 80.5 per cent of the total, whereas in 1915, when the tonnage of all weights was almost the same, the rails weighing 85 lb. or more represented only 65.0 per cent of the total.

TABLE 4—PRODUCTION OF RAILS BY WEIGHT PER YARD, 1905-1920

Years	Under 45 pounds	45 and less than 85	85 and less than 100	100 pounds and over	Total Gross tons
1905	228,252	1,601,624	1,546,053		3,375,929
1906	284,612	1,749,650	1,943,625		3,977,887
1907	295,838	1,569,985	1,767,831		3,633,654
1908	183,869	687,632	1,049,514		1,921,015
1909	255,726	1,024,856	1,743,263		3,023,845
1910	260,709	1,275,339	2,099,983		3,636,031
1911	218,758	1,067,696	1,536,336		2,822,790
1912	248,672	1,118,592	1,960,651		3,327,915
1913	*270,405	†967,313	2,265,062		3,502,780
1914	*238,423	†309,865	868,104	528,703	1,945,095
1915	*254,101	†518,291	742,816	688,995	2,204,203
1916	*295,535	†566,791	1,225,341	766,851	2,854,518
1917	*308,258	†882,673	989,704	763,526	2,944,161
1918	*395,124	†665,165	888,141	592,462	2,540,892
1919	*263,803	†495,577	965,571	478,892	2,203,843
1920	*489,043	†433,333	952,622	729,118	2,604,116
1921	*211,568	†214,936	902,748	849,566	2,178,818

*Includes rails under 50 pounds.
†Includes 50 pounds and less than 85 pounds.

Freight Car Loading

WASHINGTON, D. C.

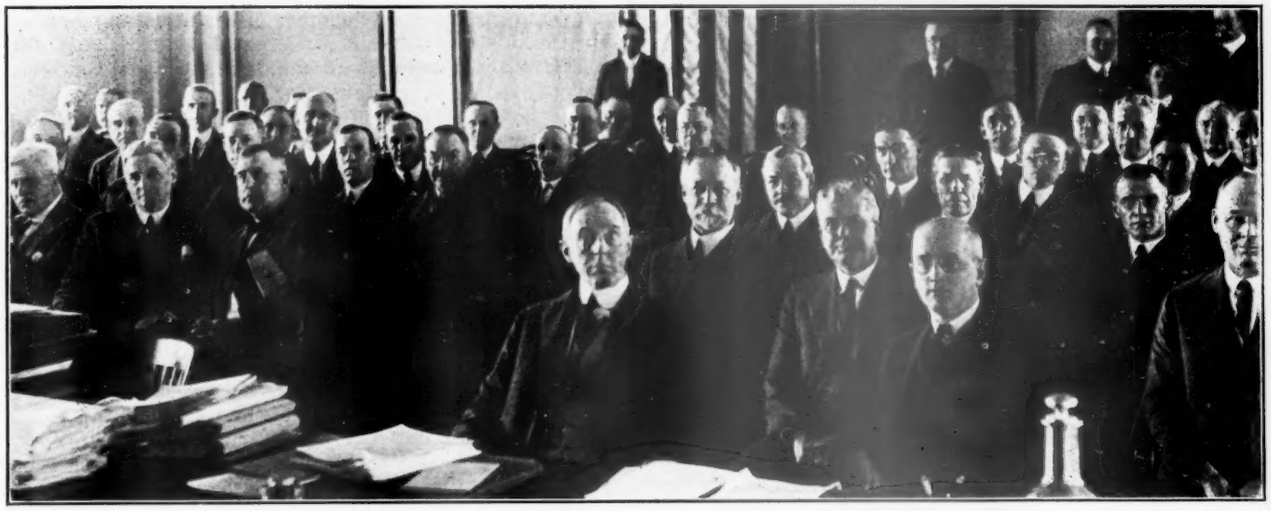
FREIGHT CAR LOADING during the week ended on April 8 naturally reflected the decrease in coal traffic resulting from the strike, but it still represented an increase as compared with the corresponding week last year. The total was 714,268 cars as compared with 694,881 in 1921 and 801,559 in 1920. The decrease as compared with the week before was 112,000 cars. The number of cars of coal loaded fell from 184,952 in the week ended April 1 to 69,456 in the week of April 8, a decrease of 115,000. During the corresponding week of 1921 the coal loading was 126,461 cars.

As compared with last year there was a decrease in the loading of grain and grain products, livestock and coal, but increases in coke, forest products and ore and large increases in merchandise and miscellaneous freight which more than made up for the decrease in coal. In the Pocahontas district, where many of the non-union mines are located, the coal loading was greater this year than last year.

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, APRIL 8, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded: This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	5,905	2,758	6,940	1,607	4,361	1,337	69,531	73,826	166,265	.....	.....
	1921	5,709	2,682	37,467	780	5,273	430	57,314	61,327	.....	171,482	192,205
Allegheny	1922	2,096	2,653	19,955	4,716	2,579	3,568	51,042	63,873	150,482	.....	.....
	1921	1,949	2,591	38,688	4,777	2,236	826	41,420	48,158	.....	140,645	182,343
Pocahontas	1922	235	76	21,387	234	1,241	29	5,992	4,447	33,641	.....	.....
	1921	120	91	15,169	148	1,190	37	5,011	3,505	.....	25,271	32,902
Southern	1922	3,000	2,152	12,351	488	18,348	688	38,440	45,647	121,114	.....	.....
	1921	2,981	2,031	15,253	582	14,103	700	36,587	40,540	.....	112,777	122,861
Northwestern	1922	8,241	6,942	3,395	1,182	16,652	804	29,772	29,938	97,026	.....	.....
	1921	7,718	6,202	3,433	542	13,409	549	27,141	28,564	.....	87,558	105,175
Central Western	1922	8,319	8,280	3,856	198	4,709	1,129	32,611	34,551	93,653	.....	.....
	1921	10,103	9,601	12,930	117	4,975	1,796	29,655	32,427	.....	101,484	114,444
Southwestern	1922	3,702	2,163	1,572	174	6,790	704	16,330	20,652	52,087	.....	.....
	1921	4,852	2,277	3,531	111	5,775	521	16,654	21,943	.....	55,664	61,629
Total Western Districts	1922	20,362	17,385	8,823	1,554	28,151	2,637	78,713	85,141	242,766	.....	.....
	1921	22,673	18,080	19,864	770	24,159	2,776	73,450	82,934	.....	244,706	271,248
Total all roads	1922	31,598	25,024	69,456	8,599	54,680	8,259	243,718	272,934	714,268	.....	.....
	1921	33,432	25,475	126,441	7,057	47,461	4,769	213,782	236,464	.....	694,881	.....
	1920	29,360	25,938	171,532	13,509	61,724	15,610	159,533	324,353	.....	.....	801,559
Increase compared	1921	.....	.....	.....	1,542	7,219	3,490	29,936	36,470	19,387	.....	.....
Decrease compared	1921	1,834	451	56,985	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1920	2,238	.....	.....	.....	.....	.....	84,185	.....	.....	.....	.....
Decrease compared	1920	.....	914	102,076	4,910	7,044	7,351	.....	51,419	87,291	.....	.....
April 8	1922	31,598	25,024	69,456	8,599	54,680	8,259	243,718	272,934	714,268	694,881	801,559
April 1	1922	35,034	25,935	184,952	10,652	54,016	5,811	241,037	269,574	827,011	663,171	858,827
March 25	1922	38,066	25,958	204,586	8,676	54,814	5,282	239,846	268,807	846,035	686,567	895,386
March 18	1922	39,896	26,722	190,683	8,502	54,599	5,310	237,538	260,119	823,369	691,396	855,060
March 11	1922	45,160	29,930	204,568	8,530	51,120	5,107	236,244	248,469	829,128	700,440	819,329



Some of the Listeners at the Automatic Train Control Hearings—Photo by Underwood & Underwood, N. Y.

Hearing on Train Control Concluded at Washington

Train Control Proprietors' Testimony Completes Evidence on Which Commission Will Base Decision

THE MILLER TRAIN CORPORATION had not completed the submission of its brief before the Commission at the time of our going to press last week and was not included in our report (page 927), which covered the hearing on Wednesday the 12th. The first witness on the morning of April 13 was H. H. Orr, signal engineer of the Chicago & Eastern Illinois, who testified as to the operation of the Miller device on that road.

The Miller Train Control Brief

W. B. Murray, chief engineer of the Miller Train Control Corporation, began with a discussion of the faults cited by the railroads' committee. He said that action had been taken to remedy them, and that his company was working in closest accord with the committee of the American Railway Association, the representatives of the Interstate Commerce Commission and the officers of the Chicago & Eastern Illinois. Regarding the possibility of a ramp being accidentally displaced, he said that the chances of this are extremely remote as has been demonstrated during the eight years of regular service on the C. & E. I.

As to operation under adverse weather conditions the roads' committee stated that no dependable records were available prior to May 1, 1921; but daily reports, similar to those made of the automatic signal performance, are made of the operation of the train control apparatus by the railroad; and during these eight years there have been all kinds of weather, including many storms of snow, sleet and ice; experience has conclusively proved that operation is satisfactory under all weather conditions which permit train movement. In February, 1914, it was necessary to plow snow drifts from the tracks, and the ramps were covered with snow and ice, but there was no interruption. The winter of 1918-1919 was the most severe for many years and the control operated satisfactorily on all classes of trains.

The device has been in service on 107.2 miles, double track, for eight years; 85 engines equipped and 175 ramp locations. Mr. Murray traced the development work carried on since 1908, showing the low cost of installation and maintenance. Averages of operation and maintenance for one year based on actual figures of the railroad company for five years are as follows: Engines, $8,330; ramps, $8,160; total, $16,491; an average yearly cost per engine of $98.01, and average yearly cost per ramp, $46.64. These figures include the usual 10 per cent added for supervision and use of tools on cost of labor, and 15 per cent for freight and handling on cost of materials. The interest on investment is not included. The price of installation of apparatus such as is now used on one engine division of the C. & E. I., 107.2 miles, double track, is 85 engines complete at $500 each, $42,500; 175 ramps complete at $300 each, $52,500, or a total of $85,000.

Mr. Murray said that his company could deliver 50 of the engine devices a day. All material except ramp stands, control instrument and shoe is of standard manufacture, which can be obtained anywhere. Arrangements have been made with large foundries and machine shops which have patterns of their material and are acquainted with their work.

Statement by H. H. Orr

Mr. Orr, signal engineer of the C. & E. I., has been connected with the signal department in various capacities throughout these introductory years. Replying to Attorney Lyon, he said that in the main he concurred in the report of the Miller Train Control Corporation as read.

Mr. Lyon:—Has the stop as installed and operated on your line a permissive feature?

Mr. Orr:—Yes.

Mr. Lyon:—Why do you install and operate it in that way?

Mr. Orr:—In order that the engineman may retain control of the train if he is alert. The engineman would have to release it wilfully to prevent a stop.

Commissioner McChord:—Why wilfully? Might it not be thoughtlessly?

Mr. Orr:—In my opinion it would have to be wilfully.

Replying to further questions, Mr. Orr said he had never heard of an engineman releasing brakes thoughtlessly after an automatic application.

After the conclusion of the testimony the carriers' attorney waived cross-examination, this being the only train control

company with an extensive installation which was not cross-examined.

Various Devices

Clifford Automatic Train Control & Signal Corporation.—T. J. Clifford sketched the development of train control devices during the last 50 years. Automatic train control has been advocated in the public press for a good many years, and especially after each serious collision. The speaker quoted from a paper read by W. G. Bierd, president of the Chicago & Alton, before the Western Society of Engineers at Chicago on October 21, 1920, after which he gave a general description of his device. The functioning of his device when a train is in live territory cannot be prevented by manipulation of the engineman.

H. W. Richard stated that he had been engaged in development work for about seven years. He described his device, and in reply to Mr. McChord, said that he expected to have it ready to be installed in about three weeks.

Warthen Automatic Train Control Corporation.—A. F. Dulin, presenting the brief for this company, said that up to the time of Mr. Warthen's death in 1919 he had kept in close touch with the development of this field and with the Bureau of Safety. Mr. Dulin set forth his claims regarding patents, cost, and adaptability. He declared that the intermittent contact type had proved its case. The carriers have stated that the induction type is preferable and want time for it to be developed; but they have had time to try out all of these devices, and the unnumbered millions of the traveling public demand protection without further delay.

W. A. Brown, speaking for the Warthen company, presented an itemized statement of cost. The estimated cost of wayside apparatus is $585.95 and locomotive apparatus $497.50, or a total of $1,053.45 for one location of wayside apparatus and one locomotive. Reductions might be made if the electric headlight generator were to be used.

Nevins-Wallace Train Control Company.—L. R. Wallace presented the brief for this company, stating that its device was of the mechanical ground trip type electrically controlled.

The General Railway Signal Company and the Union Switch & Signal Company did not take the stand but presented statements for the consideration of the Commission.

Abstract of Remarks by G. P. Finnegan

George P. Finnegan presented a written statement in which the railroads were criticized for their attitude on the whole train control question. He has worked on this subject for over 20 years developing and patenting trips, ramp rails, electric and mechanical contacts on engine, continuous a. c. control with a plurality of frequencies and, finally, intermittent induction. The avoidable losses due to wrecks and the absence of train control would finance the installation of train control on the principal railways of America.

"Railroads are so positive that trains will make prompt arrivals that they sell insurance, guaranteeing that the passenger will be delivered on time; and the whole responsibility rests on the engineer, and he depends on the wayside signals to guide him in his flight. Although signals have been in a state of development for the past 50 years under the supervision of the most able engineers in the world, they still fail to function perfectly and they have the physical defects of being unreadable under various conditions, such as snow storms, fogs or a blanket of smoke. Therefore, aside from the ability of the track circuit to report a defect in the rail, what does the most up-to-date form of signals add to railroad safety? They simply accelerate traffic over the rails, admittedly at the cost of safety. However, the higher railroad officials naturally do not want to spend money for new things and they wonder why the signal companies have not up to the present time shown any determined interest in train control. There are hundreds of engineers employed by railroads in the maintenance of signal systems, and the majority of these engineers are pupils of the signal concerns, many of them having worked for these corporations. The stock of goods that are put in their hands to work with are mostly manufactured by and purchased from the signal companies, and so naturally these engineers prefer to deal with those who have an able force of engineers to help them install and maintain; so the signal companies have been sitting back in their traces with respect to train control. The signal makers know that reliable cab signals are more desirable than the junk that they deliver to the railroad companies today, therefore, why not wait; in fact, why not retard, if possible, any movement towards automatic train control and cab signals? But at the eleventh hour we see them rushing about trying to bite a mouthful from some poor inventor's dream and go out after the business that seems forthcoming.

"The Interboro Rapid Transit Company of New York, the Pennsylvania and the Baltimore & Ohio afforded us every courtesy in assisting to develop the principles of train control. There are also other railroads which have granted permission to inventors whereby they might develop their devices; such as the Erie (18 years ago).

"The Lackawanna has permitted the installation of several devices, including those of the Union Switch & Signal Co., within the past 15 years, and, strange as it may seem, they are still determined to find an efficient system of speed control. We are glad to inform this commission, and some of the old guard of signal engineers who 20 years ago thought Finnigan's train control ideas were loony, that the Lackawanna has entered into an agreement to install 15 to 30 miles of the Finnigan induction traffic speed control with a view of equipping the whole system. The installation will be made on the main line between Hoboken, N. J., and Scranton, Pa., work to begin at once. Who's loony now? Yes, boys, 'the world do move.'

"Many signal engineers for a long time have been in favor of train control and have endeavored to keep themselves posted; but there are many dyed-in-the-wool anti-control signal engineers who have not missed a single chance to submerge train control when the opportunity was offered. These men are on record at every official meeting within the past 12 years as train control knockers. . . .

"In 1910 and 1911 on the Interboro line, in New York, our system of train control was commended by J. M. Waldron, signal engineer of the Interboro. With this induction apparatus we developed a remarkably simple form of speed control. The engine apparatus designed on a closed circuit had no contacts or moving parts, and if it failed it failed safe.

"Some of the parties who inspected this system at that time were J. P. Coleman and F. L. Howard (U. S. & S. Co), Oler and Allen (P. R. R.); also Charles Stephens (C. & O.), who since that time has done more to develop and operate automatic train control on steam railroads than any man in America. The device was also inspected by the famous 'we-don't-want-to-find-train-control' committee of the New York Central, composed of Elliott, Mock, Balliet, Rose and Denney. These men saw the device under all conditions of flexibility that could be required by any railroad and it functioned 100 per cent.

"For a practical device for mixed railroad traffic we are confronted with cold, hard facts, and these facts have been laid down in commandments issued by your commission. There is nothing in these requisites but what should be conformed to. The conditions are reasonable. . . . The engine apparatus should be of few parts, as it is almost impossible to maintain electrical contacts or moving parts on an engine, due to impact and vibration.

"We have recently heard much discussion of automatic train control on the engine subject to manual control. Is not

the object of automatic control to eliminate the human element, and does not this feature re-introduce it? Why is train control desirable or worthy of consideration if the human element still exists in operating trains? Are all these years of toil and millions of dollars that have been consumed by hundreds of inventors trying to eliminate the human element to be annulled and the conditions made more hazardous by introducing instead of one engineer, two 'piano players' on each locomotive, whereby the cardinal principle is submerged? Has not an engineer running at 75 miles an hour with signals appearing every 50 seconds, enough responsibility, with the care of his engine, without adding to his burden the task of synchronizing himself with the other piano player in letting themselves past the signals and creating a condition more hazardous than the present signal system?

"Anyone aware of the responsibility of an engineer or fireman running a high speed train, will agree that these men have no time to play tag around the boiler of a fast moving train.

"If we are to have automatic train control, let it be automatic. Do not install any device that will produce any degree of degradation on the engineer nor inconvenience his control while he elects to run safe. When a device is shown in operation to conform to these conditions, the railroads may be expected to be glad to accept it as a financial and humanitarian adjunct to their system. . . ."

The Simmen System

P. J. Simmen, of the Simmen Automatic Railway Signal Company, outlined his years of development work. His company has developed an automatic block system, a speed control device, and a remote control dispatching and recording system. He told of his agreement with the General Railway Signal Company, under which that company was licensed to use his speed control device, and by means of which train control has been carried beyond the experimental stage. He described his speed control and train dispatching system as installed on the Indianapolis & Cincinnati Traction Company's line. Mr. Simmen would make no provision to enable an engineman to prevent the automatic application of the brakes except by properly reducing speed. He would favor making a record every time the engineman permits the air brakes to be automatically applied, and discipline him for unnecessary operations. C. C. Paulding, attorney for the carriers' committee, asked Mr. Simmen some questions about the operation of cab signals. Mr. Simmen declared that on general principles cab signals are less costly than our fixed signal installations.

Edward Stegelmeyer, secretary of the Automatic Train Control Company, presented a brief describing his electrically controlled mechanical trip type of train control. It was tried on the Big Four in 1909. When asked by Mr. McChord why these tests were not continued, he said that he did not know. Regarding his attempt to get a test installation on the Monon road, Mr. Stegelmeyer said that the president had promised to allow a test to be made after the end of federal control, but up to the present time nothing had been done. Replying to Mr. Borland as to what facilities he had to make an installation, Mr. Stegelmeyer said that his company was prepared to handle its first order on a job lot basis.

A. J. Brookins, describing the Brookins-Burdette train control sytsem, said that he had studied the subject for 10 years; and he entered into a long discussion of general principles.

M. T. Miller, attorney for the Simplex Train Control Company, presented a short brief and asked that the Commission's order be modified so that those railroads desiring to use types which have not as yet been developed could have opportunity to do so. Commissioner McChord stated that no modification of the order was needed to do that; but Mr. Miller thought that if the order was issued as now drawn, there would be a rush of the railroads for the ramp type; an extension of time should be allowed.

Thomas C. Clark's Wireless Control

J. G. Dunn presented a brief for Mr. Clark. He deemed it essential to have an efficient method of putting the indication before the engineman at any time or at any point in the block. This problem has been solved by his system. Mr. Dunn gave a brief description of the development of the apparatus, which is of the continuous inductive type, controlling the train at any point in the block. The engineman may handle his train without interference so long as he does it properly. Mr. Dunn suggested that if the order is issued now the railroads will be so busy that proprietors having devices which have not been tested will have no opportunity to show what their devices can do; and he asked that the order be held in abeyance until this system can be developed. The Pere Marquette has given permission for a 10-mile section to be installed for test purposes.

Leslie M. Shaw, representing the Julian-Beggs system, told of tests which had been conducted on the Cincinnati, New Orleans & Texas Pacific. He asked that the Commission's order be issued substantially as it is drawn, with little extension of time. It would not be fair to his clients for the uncertainty to be continued.

C. C. Paulding, attorney for the carriers' committee, stated that it was the intention of the railroads to try out the various devices.

The Shadle Train Control.—A brief was presented in behalf of this system. It called attention to the large number of collisions and the large loss of life and the cost to the railroads for these; and the opinion was expressed that some action should be taken by the railroads. A comparison of the cost of automatic train control was made with the cost of couplers, brakes, fittings for mail cars, underframes, et cetera.

The International Signal Company

J. F. Webb, Jr., secretary-treasurer of International Signal Company, said that the arguments of the carriers against the installation of these safety devices fall naturally into two classes; (a) general objection to all such devices, and (b) specific objection to the ramp type. Mr. Webb discussed the objections in detail. "The fight of the carriers against automatic train control is in line with their fight against air brakes and automatic couplers. They lost those earlier fights, but they are now blessing the days of those defeats. The day will come when the carriers will also bless the installation of this newer safety device."

James P. Whissman stated that he had developed an intermittent contact overhead, or compression trip type, and in 1908 had applied to the New York Central for permission to test it.

Regan Safety Devices Company

This company presented a great mass of exhibits. The first was an analysis of the report of the carriers' committee on inspections. In another exhibit exception was taken to the request of the A. R. A. committee for the re-insertion in the proposed order of paragraph *b,* Section 1, under automatic stops, reading "Under control of enginemen, who may, if alert, forestall automatic brake application." The Regan Company "does not agree with the committee that a forestalling feature with the automatic stop only should be permitted. If one is permitted, then the engineman may cancel at will the automatic stop, when imposed or when about to be imposed; then it is a question of the engineman's judgment as to whether his train shall be brought to a stop, or whether he shall cancel the stop himself, expecting to control

the train when it proceeds in accordance with conditions ahead as he sees them."

The exhibits presented were, Exhibit A: A reply to carriers' sub-committee; defects pointed out. Exhibit B: A detail record of the performance of the Regan device on the Chicago Rock Island & Pacific from February 12, 1920, to date. Exhibit C: A cost analysis of the testimony of railroad witnesses. Exhibit D: A map of the United States showing location of collisions which have occurred in automatic block signal territory from September 4, 1911, to May 17, 1921. Exhibit E: A series of photographs showing the condition of the storage battery used on the locomotive, and pictures showing that ramps do not interfere with men getting on or off trains, and that other obstructions such as switch stands, switch movements for electric interlocking, lamps, etc., offer greater obstructions than do ramps. Exhibit F: Analysis of the committee report on specification. Exhibit G: A series of descriptive circulars showing installations of Regan apparatus in the United States, France and Great Britain.

A. G. Shaver, chief engineer of Regan Safety Devices Company, was the first witness for that company. He gave a description of the device and cited records of engine movements, both passenger and freight, over the equipped territory. Concerning induction apparatus, C. E. Denney interrupted to ask if this type was being developed by the Regan Company; and whether it had been brought to the attention of the railroads' committee; also whether the Bureau of Safety had passed on it. Mr. Shaver replied in the negative. Regarding installations in France and Great Britain, where the ramp rail was placed between the running rails, Mr. Denney asked Mr. Shaver if that was a good thing and whether it could be used in this country. Mr. Shaver believed that in some cases it could be done.

Mr. Shaver next discussed the objections cited by the carriers' sub-committee. Certain changes in engine circuits have recently been made, and when questioned about this by Mr. Peabody, Mr. Shaver said that the changes would provide for more economical operation. Mr. Shaver stated with reference to the speed control apparatus that it will run about 100,000 miles before needing attention.

Mr. Peabody wished to know what the introduction of speed control would do on heavy mountain grades, particularly with reference to the losing of the air by repeated applications by the speed control apparatus. Mr. Shaver said there were no heavy grades in Illinois in the territory equipped. He said that enginemen must conform to the caution signal indication. A penalty should be imposed if the signal is not observed. To support the committee's contention that speed control as applied on the Rock Island sometimes stopped instead of reduced the speed of trains, Mr. Denney asked if a speed control application was liable to produce this result if the engineman fails to take action. Mr. Shaver admitted this, but said that it was in the province of the engineman to reduce speed so that the speed control does not take effect.

Mr. Denney asked what an engineman must do, and, continuing, said, "You maintain that the speed control will in some cases reduce the speed of the train and in others stop the train. The device does not do what it is designed to do. It is recognized that there is more difficulty and greater hazard in managing the speed of freight trains than of passenger trains, and the sub-committee wishes to bring out its desire to have apparatus developed so that no hazard exists to the trains themselves or to adjacent tracks through accidents, and for that reason any device developed should function at all times as it was designed to function."

At this point Mr. Shaver was replaced on the stand by C. A. Lyon to answer questions regarding the effect of speed control on freight train operation.

J. Beaumont, vice-president and sales manager for the Regan Company, was called to the stand next and attempted to destroy the force of the carriers' committee report by cross examination. After setting forth the imposing array of engineering talent in the service of the Regan Company, and their qualifications, Mr. Beaumont went on to explain the purpose of speed control, and gave further details of the installations in Great Britain and France. He then discussed the cost analysis as presented in one of the briefs. Instead of reading the entire brief, he criticised the estimates of cost which were presented before the Commission by W. H. Elliott, J. A. Peabody, C. J. Kelloway, A. W. Trenholm, W. J. Eck, and others. Regarding facilities for manufacturing, his company could manufacture 100 units of automatic train control a week, having factories at Niagara Falls, in Great Britain and in France.

W. M. Camp, editor of the Railway Review, was expected to take the stand after the train control proprietors had finished, it being the understanding that he was to explain the elimination of paragraph *b* from the Commission's order; but Chairman McChord, after a conference with Commissioner Esch, said that they had decided it would not be necessary to call Mr. Camp to the stand, enough testimony having already been taken regarding this question.

B. & M. Valuation Exceeds Property Account and Capitalization

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on April 14 made public its tentative valuation of the Boston & Maine, as of the valuation date of June 30, 1914, in which it reports the "final value" of the property owned and used for common carrier purposes, including 708.8 miles of first main track and 1,380 miles of all tracks, as $101,712,-972. The final value of the property owned and used is given as $234,189,816. This covers 2,183 miles of first main track and 4,134 miles of all tracks.

The capital obligations of the Boston & Maine outstanding on valuation date were $109,739,190, but this covers considerable property not included in the valuation report of the carrier property owned, including $2,414,820 of improvements on leased property which the commission has readjusted to $2,289,820. It also covers securities of other companies of a par value of $20,029,769 recorded on the books at $20,722,230, and also non-carrier lands which are reported at a present value of $1,555,451. The final value of the used property includes $132,476,845 for leased property, including 1,474 miles of first track and 2,752 miles of all tracks. It also includes $58,016 of property leased to others. The total capital obligations of the companies that owned the leased properties, stated separately in the report, foot up to about $110,000,000, or considerably less than the final value placed on them of $132,476,845. This would make a total of capital obligations of $220,000,000 roughly comparable to the $234,189,816 final value of the used property, although the capitalization of the corporations cannot be exactly compared with the commission's valuations of the carriers as the former cover much property not represented in the valuation.

The investment in road and equipment of the Boston & Maine as of the valuation date is stated on its books as $90,653,840, of which $59,927,508 represents the investment in road and $30,726,331 the investment in equipment. The commission's report says that if certain readjustments were made this would be reduced to $88,090,755, of which $27,-142,464 represents the par value of securities issued and assumed and other liabilities of predecessor companies, the value of which at the time of entry cannot be determined.

The original cost of the property cannot be ascertained from the records, the commission reports, but it gives the "recorded outlay" for 548 miles of road, after the deduction of about 26 miles abandoned or sold, out of a total of approximately 707 miles owned on valuation date. This includes $45,788,402 as the recorded money outlay including some short term notes, and $5,843,405 as "recorded outlays for which the consideration is undetermined." The original cost of 20,764 units of equipment is given as $30,450,035, with a statement that the carrier claims an additional $5,187,004 based on estimates.

The cost of reproduction new of all common carrier property other than land reported is $93,851,564 for the property owned and $223,317,897 for the property used. The cost of reproduction less depreciation is given as $72,174,404 for the property owned and $170,629,869 for the property used.

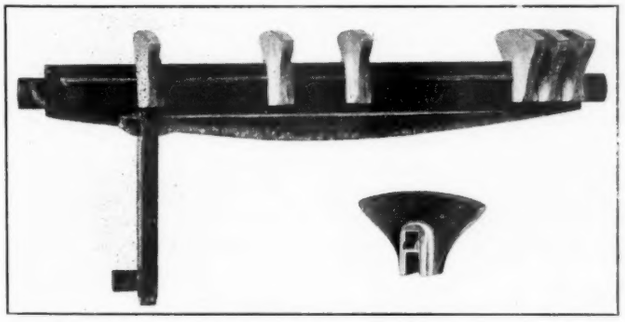
The present value (as of 1914) of carrier land owned and used is given as $16,316,256 and of the land used for carrier purposes as $44,130,611, while the excess cost of acquisition of the land is given as $12,670,673 for the property owned and $32,443,417 for the property used.

The value of materials and supplies on hand is stated as $5,702,134.

In accordance with the usual practice, the company and the state authorities on whom the report is served are given 30 days within which to file any protest against the tentative valuation before it can be made final. Some of the valuations heretofore served in the case of short lines have become final by reason of no protest being filed, but most of the roads have protested the tentative valuations and the commission has announced a number of hearings on them for various dates in May.

Service of Hulson Grates on the Wabash

THE TYPES OF GRATES generally used in locomotive fireboxes have probably been subject to less modification than any other part of the locomotive which has to do with combustion and heat absorption. The simplest form of finger bars or table castings still prevail although it is generally recognized that they have well defined limitations as



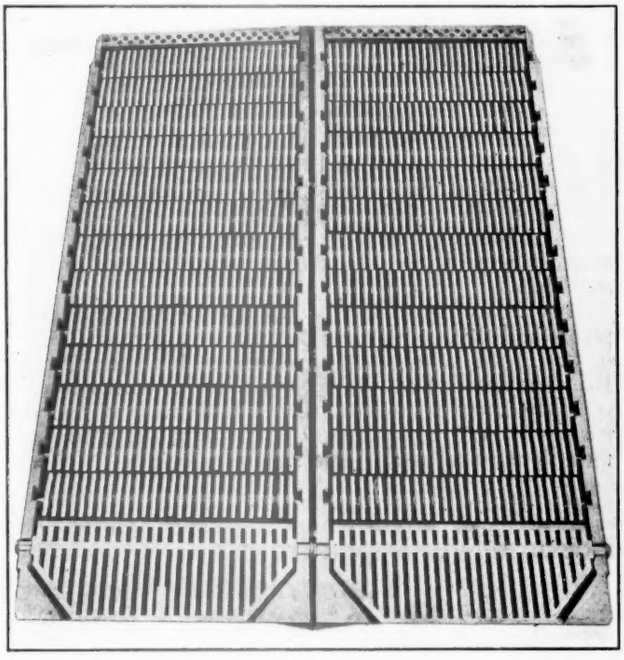
Hulson Grate Finger Bar and Fingers

to economy of maintenance, percentage of air opening and restricted removal of ash from the firebox to the ash pan.

Several years ago the Hulson Grate Company, Keokuk, Ia., brought out a locomotive grate (see *Railway Age Gazette,* August 20, 1915) in the construction of which was embodied a number of novel features designed to remove or materially extend these limitations. This grate was an adaptation of a design which at that time had already met with considerable success in stationary service. This grate differs in construction from the ordinary finger grate in that each grate bar is built up of loose fingers of light section fitted onto a finger bar which sets well below the surface of the grate, so that the openings between the fingers may extend entirely across the surface of each assembled grate instead of being interrupted at the center. This feature makes it possible to secure an air opening equal to 55 per cent of total grate area with ⅝-in. openings between fingers. This is considerably in excess of the maximum draft area obtainable with conventional locomotive grate designs, and tends toward fuel economy.

An equally important feature of the removable finger construction is the possibility of decreased maintenance which it offers. If a finger burns off in service it is replaced by a new one weighing two pounds whereas with ordinary grates it would be necessary to renew a grate bar weighing from 85 lb. to 150 lb.

Consideration of these features, together with a favorable report from another road that had its locomotives equipped with the Hulson grate, led the Wabash to equip a Ten-wheel passenger locomotive, having rather limited grate area for



A Full Set of Hulson Grates for a Wide Fire Box

the size of the boiler, in January, 1918. The service of the grates on this locomotive was quite satisfactory, and after about three years the maintenance cost was found to have been less than half that of the standard grates.

It was then decided to equip 10 Prairie type freight locomotives. These have 54.25 sq. ft. grate area, use Illinois and Missouri coal, and operate out of Moberly, Mo., principally between Moberly and St. Louis. The first of these locomotives was equipped in December, 1920; the others followed within a few months. Records have been kept of repair costs on these 10 locomotives and fuel records are available for all engines in the class.

The fuel records from May, 1921 to December, 1921, inclusive, show the following results:

Type of grate	Ave. tons per train	100 ton-miles	Tons coal	Lb. coal per 100-ton-miles	Decreased fuel consumption per 100 ton-miles, per cent
Standard	1,300	4,149,415	26,572	12.81	....
Hulson	1,340	2,665,032	16,189	12.15	5.15

Fuel records of locomotives in local service were eliminated on account of the erratic performance in local freight on the ton-mile basis.

The maintenance costs are not here compared with other

grate costs but are presented for use where costs are already known or can be derived from existing records. These grates have only been in service a year, and after several years there may, of course, be a period of somewhat higher maintenance when finger bars need renewal. The repair costs were as follows:

Total repair cost (labor and material) to Jan., 1921...	$116.27
Total grate area.....	542.5 sq. ft.
Cost of repairs per sq. ft. grate area per month.....	.0216
Cost repairs per engine per year.....	$14.05

The Hulson grate fingers roll through the fire bed instead of tearing it, and they are in favor with the firemen because of the ease with which they can be shaken. The fire is kept in better condition on the road, and on long freight divisions the cleaning of fires half-way over the road has been eliminated on these engines. It has also been possible to increase the diameter of the nozzle tips by ¼ in.

The standard grate on this class of locomotives is of good design, with about 43 per cent air opening, and the additional air opening of the Hulson grate would probably not result in as much fuel saving as on grates with but 30 to 35 per cent air opening. The experience with these locomotives, however, has led to the conclusion that the reduced maintenance cost alone will make the Hulson grate worth while. At present 10 more of the Prairie type locomotives are being equipped and it is the intention to extend the application to those classes of locomotives most susceptible to reduced grate repair cost. The locomotive grates now in service include rocker grate bars only, and while there has been no difficulty in cleaning the fire the plans are to include the Hulson shaking dump grate* in future installations.

This type of grate has a wide use in stationary power plants and during 1921 the Wabash equipped six 250-hp. boilers in the power plants at Moberly, Mo., and Decatur, Ill. The grates have the good will of the stationary firemen, and there has been a noticeable decrease in fuel consumption and in black smoke. It is the intention to extend their application to all large stationary boilers.

Locomotive Types from a Transportation Viewpoint

By J. F. Porterfield

General Superintendent of Transportation, Illinois Central

LOCOMOTIVES should be designed so as best to meet varying conditions such as the grade line, the economical train load, which will vary according to the character and density of traffic, the acquired train schedules, etc.

The items going to make up the cost of freight train operation—except crew wages—do not materially decrease with the increase in locomotive capacity, as the decreased cost of ownership per unit of service is offset by a material increase in the expense of maintenance and by decreases in the time in service and the average mileage. From various estimates, I figure the increased cost of maintaining the large 2-10-2 type, compared with the cost of the 2-8-2 type, at about 20 per cent, with a decrease of about ten per cent in mileage. These items, with the increased cost of ownership, will about equal the saving in crew wages, particularly on lines with favorable grades where the traffic consists of average weight commodities requiring prompt movement.

On train districts with more than one-half per cent grades, especially where the preponderance of traffic is in the heavier commodities not requiring preferential movement, the 2-10-2 type locomotives will sufficiently reduce the freight train cost per 1,000 gross ton-miles to justify the additional investment in locomotives, roadway, yard facilities, engine terminals, etc.

On train districts with grades of .5 per cent or less where the traffic is fairly well divided between the heavier and lighter commodities, I believe the Mikado type locomotive is the proper type to use. These locomotives will handle 75 to 90 loaded cars, which under average conditions is an economical train. While the larger capacity type will show a decrease in crew wage cost per 1,000 gross ton-miles, this saving will be more than offset by the increased cost of maintenance, investment in locomotives, roadway, yard facilities, engine terminals, etc. In addition to this there will be a loss in car efficiency incident to greater delay at terminals for full trains, and a loss in time on the road on account of the slower speed and delays incident to handling excessively long trains. These disadvantages will apply to even a greater extent on single track.

Take a train district with favorable grades where the density and character of traffic and train frequency prevent the train load from being increased. The cost per 1,000 gross ton-miles with 2-10-2 type locomotives would be about as follows:

Wages	$ .079
Locomotive maintenance	.113
Interest on investment	.058
Total	$ .25

The same items with a Mikado type locomotive would be about as follows:

Wages	$ .078
Locomotive maintenance	.093
Interest on investment	.039
Total	$ .21

This shows a loss of 19 per cent in the use of the larger locomotive.

On an Illinois Central train district with .8 per cent grades, where 60 per cent of the traffic is coal and other heavy commodities, the operation of the 2-10-2 type, with a tractive effort of 73,800 lb. shows a decrease in crew wage cost per 1,000 gross ton-miles from 41 cents to 25 cents, or 39 per cent, compared with the operation of the 2-8-2 type, with a tractive effort of only 51,630 lb.

On another train district, with grades and curvature equalling one per cent, on which 60 per cent of the traffic consists of high-class freight requiring fast time, the decrease in crew wage cost per 1,000 gross ton-miles is only 24 per cent. With a 43 per cent increase in tractive effort, the trainload increase is only 19 per cent, because the preponderance of high-class commodities requiring fast time prevents the accumulation of the tonnage for a maximum trainload. Where similar conditions prevail, I think a careful analysis will show that the increased cost of owning and operating the larger locomotive equals the crew-wage saving. However, even though there was no saving in operating cost, it might be necessary to adopt the larger locomotive to keep the train units within the road capacity.

Because of the increased cost of maintenance and of ownership and the decrease in efficiency of the extremely large types of locomotives, careful study and consideration should be given to the grade and traffic conditions, the train frequency or road capacity, the terminal expense required to reduce or increase trains, etc., before an investment is made in locomotives of the 2-10-2 and larger types. In offering these suggestions, I have assumed that, first of all, consideration will be given to grade reduction.

†From a paper presented before the Western Railway Club, Chicago, on April 17, 1922.

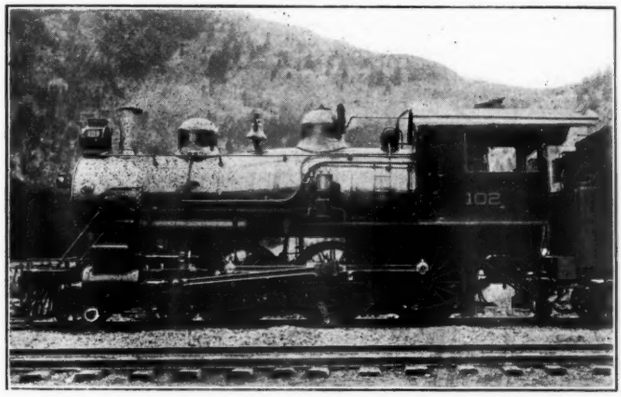
THE OLD DOMINION LINE (now the Old Dominion Transportation Company), after a vacation of two years, has resumed the running of passenger steamships between New York City and Norfolk, Va.

Thermic Syphons Save 19 Per Cent in Fuel

Improved Performance of Ten-Wheel Locomotive Enables Spokane International to Haul Heavier Trains

THE SPOKANE INTERNATIONAL operates through passenger trains over its main line from Spokane northward, a distance of 140 miles, to Eastport, Idaho, where connection is made with the Canadian Pacific. Ordinarily the trains consist of five cars, including standard sleepers and a dining car. While the time on this run is not fast, the trains do considerable local work and the grades encountered are severe so that the schedule has proved difficult to maintain with the locomotives now in service; these are of the Ten-wheel type with narrow fireboxes 19 in. by 24 in. cylinders, and 22,000 lb. tractive effort.

Another condition affecting the steaming capacity of these locomotives and limiting their ability to handle heavy trains over this road is the slow-burning character of the coal used; it contains approximately 75 per cent fixed carbon and averages 12,500 B.t.u. per lb. With this coal and the limited grate area of only 27 sq. ft., it is difficult to keep full steam pressure at all times and the fuel consumption



Installation of a Nicholson Thermic Syphon Enabled This Locomotive to Meet the Demands of Heavier Traffic

frequently exceeds 160 lb. of coal per square foot of grate surface per hour. Under these conditions not only is the capacity of the locomotives limited, but the fuel performance is not as economical as it should be. For that reason the officers of the Spokane International have recently been looking into the possibility of improving the efficiency of the locomotives and increasing their capacity so that they will be able to haul additional cars when necessary and still make the running time, thus obviating the necessity for purchasing heavier locomotives for the present.

Reasons for Installing Syphon

As a result of this investigation the road decided to apply a Nicholson thermic syphon with brick arch to one of these Ten-wheel type passenger locomotives and to test this locomotive in comparison with another locomotive of the same class which did not have the syphon but was equipped with a fire-brick arch supported on studs. In selecting the thermic syphon for this test in preference to other devices designed to improve locomotive capacity and efficiency, the railroad was governed largely by the fact that the application of a syphon would enable an immediate increase in the tractive effort by merely reboring the locomotive cylinders. As the weight on driving wheels was sufficient in this case to permit of an increase in the cylinder diameter without reducing the factor of adhesion too greatly, the application of a single thermic syphon made it possible to increase the diameter of the cylinder ½ in. without reducing the ratio of boiler capacity to cylinder capacity.

In view of the character of fuel burned, it would not have been practicable to have increased the cylinder diameter without a corresponding increase in the capacity of the boiler and while this increase may seem small, it should be borne in mind that this change in cylinder size not only added more than 60 hp. to the capacity of the locomotive, but increased its maximum tractive effort by 1,160 lb. In addition to insuring an immediate increase in the capacity of the locomotive, it was thought that the application of thermic syphons would improve the efficiency of the locomotive, not only on account of the improved boiler circulation, but also because any considerable reduction in the rate of fuel consumption per square foot of grate surface on these locomotives would in itself tend to improve the fuel efficiency of the boiler. Factors in the selection of the thermic syphon were its adaptability to the locomotive without involving extensive alterations, and low maintenance charges.

The application of one Nicholson thermic syphon in the firebox of locomotive 102 on the Spokane International was made during the past summer and on September 27, 1921, a test of this locomotive was begun in comparison with a locomotive of the same class and operating in the same service but not equipped with this device. The principal dimensions of both locomotive 102, which is equipped with this device, and locomotive 104, without the syphon, are given in the table.

LOCOMOTIVE DATA

	Non-Syphon Locomotive 104	Syphon Locomotive 102
Type	Ten-Wheel	Ten-Wheel
Cylinders	19 in. by 24 in.	19½ in. by 24 in.
Boiler pressure	200 lb.	200 lb.
Firebox heating surface	153 sq. ft.	178 sq. ft.
Tractive effort	22,000 lb.	23,160 lb.
Grate area	27 sq. ft.	27 sq. ft.

In conducting these tests it was so arranged that both locomotives hauled the same equipment and weight of train during all trips. The same engineer and fireman operated both engines. Care was exercised to make all conditions uniform in every respect. The tender was carefully weighed at the beginning of the trip, the water in the tender being measured at the same time. At the end of the trip the tank was filled so that it contained the same amount of water as when starting. Then the tender was weighed to determine the total coal consumption. Two trips were made with each locomotive.

Results of Tests

Although the tractive effort and cylinder horsepower were increased in connection with the application of thermic syphons to locomotive 102, the results of these tests show clearly the decidedly better firebox conditions and boiler conditions on the syphon-equipped locomotive as indicated in the tabulated summary of results. The increased boiler and cylinder capacity of this locomotive made it possible to handle the same train with greater ease, while the additional heating surface and improved water circulation caused by the syphon made a marked improvement in the steaming capacity of the locomotive. Maximum steam pressure was maintained at all times and the boiler was fully supplied with water during all of the runs with the syphon-equipped locomotive while with the non-syphon locomotive, it was

necessary to trade water for steam in hard places. The general performance of the syphon locomotive was reported as being much better and the coal consumption per square foot of grate area was reduced to 133 lb.

The conditions under which the tests were conducted were favorable for securing accurate comparisons. As will be noted from the summary of the test results, the number of cars and the tonnage in each case was the same. It will be noted that the locomotive equipped with a syphon used 6.16 per cent less water per ton-mile than the locomotive with the ordinary firebox. This saving is attributed to the improved steaming of the syphon locomotive which results in drier steam supplied to the cylinders. Part of the saving is also due to the fact that the blower was used much more on the locomotive without the syphon. The pounds of coal per thousand gross ton-miles with the syphon locomotive was

Summary of Test Results

Date of test	Non-Syphon Engine 104 October, 1921	Syphon Engine 102 September, 1921	Difference Favor 102
Tonnage—average per trip	269	269	.....
Mileage per trip	145	145	.....
Gross ton-miles—average per trip	39,020	39,020	.....
Number of cars—average per trip	5	5	.....
Car mileage—average per trip	725	725	.....
Total coal used, as fired, pounds; average per trip	22,190	17,980	19 per cent
Total water used, pounds, average per trip	82,942	77,833	6.16 per cent
Pounds coal (as fired) per 1,000 gross ton-miles	569	461	19 per cent
Pounds coal (as fired) per locomotive mile	153	124	19 per cent
Pounds coal (as fired) per car mile	30.6	24.8	19 per cent
Pounds water evaporated per pound of coal	3.738	4.329	15.81 per cent
Pounds water per 1,000 gross ton-miles	2,126	1,995	6.16 per cent

19 per cent less and the pounds of water evaporated per pound of coal, 15.81 per cent greater. Based on these figures, the locomotive with the Nicholson thermic syphon would save on this run approximately 770 tons of coal a year which, at $5.70 per ton on the tender, would represent a decrease in the expenditure for fuel of $4,390.

As a result of these tests, the Spokane International has ordered syphon equipment for a freight locomotive which will enable the railway to increase the diameter of the cylinders on this locomotive one inch, thus materially increasing the tractive effort and cylinder horsepower.

Wage Cuts for Clerical Forces Before Railroad Labor Board

Hearings in the present controversy over proposed reductions in the rates of pay of various classes of railway employees continued before the Railroad Labor Board during the past week, the majority of the time being consumed in the presentation of evidence bearing on the wages of clerical forces.

The character of the evidence presented by representatives of the railroads is illustrated in the testimony of J. H. Higgins, representing the western carriers, who, after pointing out the decreases which have taken place in the cost of living since the last wage reduction, summarized the results of an investigation of clerical wages in other industries in western states as follows:

Of 318,893 employees of all classes employed by other industries, 17,104 or 22 per cent are performing work comparable to that performed by clerical forces of the western roads. Of these employees 27,484 or 31 per cent would be rated as clerks if they were employed by the carriers, 31,132 or 44 per cent would be rated as unskilled employees in the clerical department, and the remaining 35 per cent would be rated as supervisory or miscellaneous office and station forces.

Of the 27,484 clerks in other industries, 19,701 or 72 per cent were found to be receiving lower wages than are paid by the railroads for like services. Of the 31,132 comparable unskilled employees in other industries, 25,982 or 83 per cent were found to be receiving lower wages than prevailed for comparable work for the carriers.

Of the employees in other industries in 26 of the principal cities in the western territory, 39,553 or 32 per cent were found to be performing work comparable to that performed by the clerical forces, covered in this hearing. Of these employees, 31,506 or 80 per cent were found to be receiving lower wages than prevailed for analogous work for the carriers.

In addition, Mr. Higgins pointed out the wide range in the rates prevailing in other industries as between various western states and cities.

J. G. Walber and W. A. Northcutt, representing respectively the eastern and the southeastern carriers, presented similar evidence for their respective territories.

E. H. Fitzgerald Presents Employees' Case

The employees' case was directed by E. H. Fitzgerald, president of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees. The gist of Mr. Fitzgerald's testimony was summarized by him as follows:

The evidence in this case on behalf of the clerical forces will attempt to show:

(1) that the clerks' wages are now lower than those prevailing in other industries;

(2) that the present wage rates for clerical forces fall far short of a "minimum health and decency level";

(3) that a rise in prices and therefore in the cost of living is inevitable;

(4) that the increase in wages of clerical forces are small when computed over a long period of years rather than from an arbitrary point selected by the carriers because of the relation at that time of wages to prices and other factors;

(5) the relation between wages and rates;

(6) the relation between rates and business conditions;

(7) that wage reductions have always been accompanied by increases in dividends;

(8) that wage reductions will not reduce the cost of living; and

(9) that wage reductions at this time will tend to check the recovery of business.

Disputes involving proposed reductions in the rates of pay of signalmen and train dispatchers occupied all of the Board's sessions on April 18 and 19. J. G. Luhrsen, appearing on behalf of the train dispatchers, defended the present rates of these employees on the grounds of the skill and training required to perform the work properly and upon the grounds that a reduction in the rates of pay of train dispatchers would destroy differentials that have always existed between the wages of these employees and of train service employees.

Labor Board Considers Wage Cut for Signalmen

Hearings before the Labor Board on the rules for engineers and firemen scheduled for May 1 have been postponed indefinitely. The reasons given by the Board are, first, a conflict with the date of a convention of the Brotherhood of Locomotive Firemen and Enginemen, second, the work of the Board will not be expedited but may be confused and retarded by beginning lengthy hearings on the day following the close of the present wage hearing, and, third, eastern roads have asked for a separate hearing of disputes involving the rules of these employees. The Board in addition granted the eastern carriers the separate hearings referred to the date to be set later.

The controversy between the railroads and their signal

department employees was taken up by the board on April 17. Representatives of the carriers repeated their requests for reductions in the rates of pay of signal department employees ranging from 5½ to 14 cents per hour. D. W. Helt, president of the Brotherhood of Railroad Signalmen, presented the employees' case, citing in defense of the present rates of pay the responsibility of these employees, the skill and training required of them to perform their work properly and the value of their services to their employers.

The rate at which the hearings are now progressing indicates that the whole controversy over proposed wage reductions will be in the hands of the board for decision prior to May 1, the dead line recently set by the board. Several of the smaller organizations will present their testimony during the present week, but it is not expected that this will consume a great deal of time.

Contracting of Work by Railroads Not New

Maintenance of Way and of Equipment and Even Running of Trains Handled by Outsiders as Early as 1855

THAT THE HANDLING of railway work by contract is by no means a present day innovation is shown by old records and reports of the Philadelphia, Wilmington & Baltimore, now a part of the Pennsylvania System, which has been brought to our attention by Samuel M. Felton, president of the Chicago Great Western. These records show that the contracting of many railway operations were carried out at a very early period. The contracts which have been entered into recently by various railroads and which have attracted much attention have been confined principally to the repair of cars and locomotives and to the maintenance of tracks and structures. Those in the earlier days of the Philadelphia, Wilmington & Baltimore covered a much wider scope, amounting practically to entire operation and maintenance as well as some of the items of new construction.

The first mention of the contract system is in the annual report of the Philadelphia, Wilmington & Baltimore for 1854. Samuel M. Felton, Sr., then president of the company, said the plan had been "examined and discussed," and referred to it as being in his opinion adapted to secure the greatest economies, both in labor and materials. He predicted its general adoption throughout the country. In the report for the next year, 1855, Mr. Felton stated that the contract system had been placed in partial operation for the latter six months of the year and had effected a saving of $33,070 in operating expenses, the expenses for the first half of the year when no contracts were in effect were $209,083 and for the second half, $176,013.

Contractors Given Broad Responsibilities

The broad scope of the contracts is indicated by an entry in the directors' minute book, showing that on June 17, 1856, President Felton reported that responsible parties had submitted offers for one year, to supply under contract all wood, oil and waste; to keep engines in repair and furnish men to run them; to furnish labor to keep the road in repair, to lay new track and turnouts not exceeding seven miles; to furnish all labor in the freight department and clerical hire; and to take all risk and damage to freight in transit, and all loss on freight in collection.

President Felton recommended the acceptance of this offer, which the board approved. In consequence on August 19 of that year he presented contracts, made under the authority conferred by the board, and described as follows:

1. Contract with A. J. Barrett, George Stearns, Jr., William Stearns and Henry F. McKinney, for operating the road for one year from August 1, 1856;
2. Contract with Andrew C. Gray for operating the road from Wilmington to any and all points on the Delaware Railroad and the New Castle & Wilmington and New Castle & Frenchtown for one year from August 1, 1856;
3. Contract with William Windle for taking care of the Southwark depot and collecting tolls, etc., on the Southwark Railroad;
4. Contract with Charles P. Dare to perform the duties of depotmaster, to furnish watchmen and for work at the depot in Philadelphia.

In subsequent reports for a number of years, President Felton made enthusiastic references to the success of the contract system. A typical comment from the annual report of 1856 follows:

"All the trains are now run at a stipulated price per mile, including repairs and renewals of locomotives, fuel, oil and waste and wages of enginemen and firemen. The labor on repairs of road is also furnished by contract. The freight business is paid for by the ton in all its details, including loss and damage, and wages of conductors and brakemen. The fuel for all the stations, shops, steamboats, cars and for the ferry, is furnished for a stipulated sum per year. This system, more effectually than any other, brings to bear upon the affairs of the company the element of individual responsibility, the true element of success in any business."

Again in the report for 1857, Mr. Felton said, "Nothing can more effectually secure promptness, energy and thoroughness than this system, properly carried out in the hands of faithful contractors." In the annual report for 1858, Mr. Felton attributed the regularity of train movements and practical freedom of accidents to the operation of the contract system. For the following year, substantially the same comment was made.

In the report for 1860, after referring to the fact that the system had been extended to details not previously embraced, Mr. Felton said, "The work is better and more cheaply done and with more regularity and safety than under the old system, and we feel confident that in our case it has largely contributed to the success of the road."

The contract system on the Philadelphia, Wilmington & Baltimore, proper, passed out of existence during the Civil War. The fiscal year 1862 was the last under which general operation and maintenance were performed by contract. In his report for that year, under the heading "The Contract System," President Felton said:

"This system, which has been in operation on this road for several years, and resulted in great saving in expenses, has been given up for the coming year in most of the departments, because the prices of the principal articles used in operating the road had so rapidly increased and were so uncertain as to the future, that it was deemed more for the interest of the company to take the risk of future prices, than to pay an amount for the service by contract which would cover all the risks that the contractors would be liable to."

In order to be sure of the quality of the materials purchased, the president of the company supervised all purchases and charged them to the contractor. The working of the contract system may be judged to some extent by the follow-

ing compilation of receipts and operating expenses for a series of years both before and after adoption of the plan. The figures are for the Philadelphia, Wilmington & Baltimore, proper, excluding the branch lines:

PHILADELPHIA, WILMINGTON & BALTIMORE

(Excluding affiliated branches)

Company's fiscal year	Method of operation	Earnings	Operating expenses	Operating ratio, per cent
1850	No contracts in effect.....	$503,161	$218,755	43
1851	No contracts in effect.....	580,723	252,784	43
1852	No contracts in effect.....	667,785	284,284	43
1853	No contracts in effect.....	868,037	(a)348,310	40
1854	No contracts in effect.....	930,370	391,434	42
1855	Contracts in effect one-half year..	942,449	401,325	43
1856	General contract system.....	1,105,101	421,702	38
1857	General contract system.....	1,119,910	400,088	36
1858	General contract system.....	1,075,962	394,418	37
1859	General contract system.....	1,014,963	379,695	37
1860	General contract system.....	1,210,598	451,109	37
1861	General contract system.....	1,494,676	488,275	33
1862	General contract system.....	2,293,579	649,719	29
1863	No contracts in effect.....	2,540,248	956,561	38

(a) Report states this item is about $25,000 too high, owing to a change in accounting during year.

It will be observed that during 1862 the operating ratio fell to the remarkably low figure of 29 per cent. This was evidently a very trying year for the contractors, as the old records state they sustained a heavy loss. In consideration of this the board of directors authorized the payment to them of the additional sum of $13,000.

A specimen contract form accompanying files on this subject discloses the interesting character of the agreements entered into in connection with these railway contracts. Under the terms of this form the railroad turned over to the contractor all the locomotives with the stipulation that the contractor provide the entire force for their operation and upkeep, including not only the maintenance attending ordinary wear and tear, but also to make good all damage resulting from accidents. With certain exceptions the contractor was required to employ all the train crews and the entire station forces as well as the passenger and freight department employees, including even the general freight agent and the freight solicitors.

The contractor also took over the entire maintenance of the tracks, including the laying of certain lengths of new trackage specifically mentioned in the contract. The maintenance of bridges and the maintenance of all cars remained in the hands of the railroad company. Another stipulation required the contractor to undertake all emergency work, including the employment of all additional men required to make good damage done by storms, floods, etc. The railroad company provided insurance against fire damage, but the contractor was liable for any losses resulting from carelessness of any one in his organization. The contractor was also liable for loss and damage to freight or personal injuries to passengers or employees.

Expenditures and disbursements were handled through the treasury of the railroad company. All moneys received by the station agents or other persons were turned into the railroad's treasury, a certified payroll of the contractor was furnished the railway each month and necessary funds were turned over to the contractor to pay his men. The compensation to the contractor was provided on the basis of certain fixed amounts stipulated in the contract for carrying out the various services required of him.

SENATOR ARTHUR CAPPER of Kansas, who has recently succeeded to the leadership of the "agricultural bloc" formerly held by Senator Kenyon, in a speech in the Senate on April 13 stating the aims of the farm bloc, said it "believes railway freight rates are too high and must come down" and that it "would restore to state railway commissions much of the power taken away from them by an unwarrantable interpretation of the transportation act by the Interstate Commerce Commission." This "unwarrantable interpretation" was recently upheld by the Supreme Court.

Storage Battery Truck with Crane of Unusual Length

THE ELWELL-PARKER Electric Company, Cleveland, Ohio, has recently developed an electric truck with a carrying capacity of 3,000 lb. and a revolving counterbalanced crane of unusual length. The crane is a handy, portable device for hanging smokebox doors or air pumps on locomotives in shops or engine houses. It is also adaptable to use in storerooms to handle castings, lighting generators and other parts which can be safely and easily stacked, reducing the storage space usually required.

The heavy vertical steel column has a long bearing in a pedestal bolted to the steel platform on the truck, and supports a 12-ft. boom which may be racked in or out by the

Elwell-Parker Truck With 8-Ft. Power Crane

operator without leaving the driving position. The hoist is operated by a separate motor direct-connected to an enclosed hoist mechanism. It is mounted on a steel frame which houses the battery, the battery, hoist and motor all acting as a counterbalance. A special trip switch mounted on the front of the battery box stops the inward motion of the boom as set.

The crane is designed to pick up 1,000 lb. at an 8-ft. outreach, or with outriggers in position as shown 3,000 lb. at 6-ft. outreach. The boom may be lowered to permit entrance of doorways. The outriggers are quickly adjusted, folded and swung in beside the crane column when not in use.

The truck is equipped with 21½ in. by 3½ in. drive wheels and 15 in. by 3½ in. trailing wheels, all four of which steer. Large wheels permit use in yards. A coupler is furnished on the rear to permit using the unit for intermittent tractor service. Motors, differential worms, wheels and crane pillar column are all fitted with ball bearings. A single battery furnishes power to propel the truck as well as to operate the crane.

GEORGE E. MACE, of the transportation bureau of the Boston Chamber of Commerce, has resigned to become traffic manager of the Chamber of Commerce of Trenton, N. J.

General News Department

Fire at Pennsylvania Shops

The shops of the Pennsylvania Railroad at Meadows, N. J., were damaged by fire on the morning of April 16 to the extent of $175,000. The erecting shop, cabinet shop, paint shop and tin shop were a total loss.

Preservation of Railroad Records

The Interstate Commerce Commission has issued an order that the period of federal control shall not be computed in determining the periods of time after which carriers are permitted to destroy their records, as provided for in regulations prescribed by the commission in 1914.

New York Central Shops on Piecework Basis

Three shops of the New York Central, which have been idle for six weeks or longer, were reopened on Monday of this week with about 775 men at work at piecework rates. These are the shops at West Albany, N. Y.; Avis, Pa., and Collinwood, Ohio. It is said that the rates of pay will be about 25 per cent higher than those which prevailed in 1917.

The Labor Board's New Quarters

On and after April 24, 1922, the Railroad Labor Board will be located in the Transportation building, 608 South Dearborn street, Chicago, and all communications intended for the Board should be addressed accordingly. Unless otherwise advised, all hearings will be conducted in the new hearing room on the twenty-second floor of the above-mentioned building.

Phillips Not to Quit Labor Board

Albert Phillips, member of the labor group on the Railroad Labor Board, whose resignation was tendered several weeks ago, will continue to be a member of that body, according to an announcement made by the Board on April 19. Mr. Phillips resigned because of continued ill-health, but it is stated that he will be able to complete his term, which expires in April, 1923.

Swindlers Collect Money Ostensibly for Mileage Book Campaign

Swindlers claiming to represent a movement to secure a law reducing rates for mileage tickets, and asking for money to promote such a law at Washington, are said to be unusually active just now, while a bill for such a law is under discussion in a Congressional committee. These "solicitors" usually carry a petition addressed to some territorial passenger association (which is never presented), and claim to represent the "Interstate Travelers' League" or some other imaginary association. All legitimate commercial organizations interested in railroad fares have repudiated these frauds.

Harris Bill on Steel Cars Amended

The Interstate Commerce Commission in a report on a bill introduced by Senator Harris of Georgia, to compel the use of steel passenger cars, has recommended that a year be allowed for study of the matter, and the bill has been modified accordingly.

The commission told the senators that the proposed bill would introduce many complications where existing roadbed and structure would not be heavy enough to support steel cars; also that the progress in recent years in the construction of steel cars and cars with steel under-frames, had been voluntary on the part of the railroads; and that to prevent shortage the retirement of the remaining wooden cars would have to be extended over a period of years.

The opinion was also expressed that legislation at present should provide only that no wooden cars should be located in a passenger train between or ahead of steel or steel under-frame cars.

Effective Date of Tank Car Specifications Announced

The Mechanical Division of the American Railway Association has issued a circular announcing that the effective date of the requirements of Section *7c* of the specifications for Class I and II tank cars, and the last paragraph of Section *7c* of the specifications for Class III and IV tank cars is further extended to July 1, 1923. The sections of the Tank Car Specifications referred to provide that no nipples, valves or other attachments shall project below the bottom outlet cap except while the car is being unloaded.

Exhibits and Entertainment at Fuel Association Convention

Detail arrangements are being completed for the convention of the International Railway Fuel Association to be held at the Auditorium Hotel, Chicago, May 22-25. The International Railway Supply Men's Association is arranging for exhibits and space is being taken rapidly. Entertainments are planned for Monday, Tuesday and Wednesday evenings, including moving pictures of coal mining operations, an informal reception and dance and a dinner.

The Sciotoville Bridge of the Chesapeake & Ohio Northern

The continuous truss bridge of the Chesapeake & Ohio Northern over the Ohio river at Sciotoville, Ohio, was the subject of a paper presented by Gustav Lindenthal, consulting engineer, New York, before the regular meeting of the American Society of Civil Engineers at New York City on Wednesday, April 5. The Sciotoville bridge is the second largest continuous truss bridge in the world having two spans, 775 ft. center to center of bearings and presented a large number of unusual problems and difficulties. Mr. Lindenthal described in detail the major problems of design, the methods of erection, which had to be worked out in fine detail, and the results obtained, illustrating his talk by means of lantern slides.

Machinists' Union Asks Limitation on Contract Work

The International Association of Machinists has filed a petition with the Interstate Commerce Commission referring to the charges which it made before the commission last year regarding the practice of the railroads in sending locomotives to contract shops for repairs and asking the commission to extend its investigation of the "contracting out" practices of the railroads to cover also the practice of closing their own shops and farming out work to existing private companies or companies especially formed for this purpose.

The commission is asked further to investigate the relationship of financial control, if any, between the carriers and the companies to which the work is transferred and to issue an order forbidding the letting out or transfer of shop work which was not wholly or in substantial part performed by the carriers at the time of the passage of the transportation act, except after obtaining from the commission a permit authorizing such work, such permit to be issued only for specific cases and subject to the conditions that the work could not be done in the railroad shops, that the contract prices are not excessive, and that the labor standards established by the Railroad Labor Board shall be observed in full by the contracting shops.

Operating Statistics of Large Steam Roads—Selected Items for the Month of February, 1922,

Region, road and year		Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross. Excluding locomotive and tender	Ton-miles (thousands): Net. Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:													
Boston & Albany	1922	394	243,687	262,649	29,460	4,409	67.1	230,565	92,999	116	27	18.9	...
	1921	394	240,140	258,441	30,152	3,844	61.1	219,481	89,683	127	30	19.1	...
Boston & Maine	1922	394	240,140	258,441	30,152	10,611	70.1	551,380	230,200	322	133	29.2	45
	1921	2,469	494,830	548,666	50,873	9,273	68.1	518,462	228,511	338	117	25.8	57
N. Y., N. H. & H.	1922	1,960	401,272	440,744	24,735	9,892	69.5	502,667	217,154	280	78	21.7	22
	1921	1,959	394,484	426,026	34,136	8,370	66.8	452,695	200,711	299	65	17.8	31
Great Lakes Region:													
Delaware & Hudson	1922	887	366,260	483,721	32,691	8,819	62.5	595,560	302,033	272	42	13.5	97
	1921	880	378,159	525,679	34,148	8,363	56.8	601,043	292,723	280	35	11.2	50
Del., Lack. & Western	1922	994	476,367	589,526	111,654	13,688	68.5	729,232	329,589	300	64	17.5	17
	1921	995	448,220	523,326	113,241	12,017	65.2	693,223	321,373	319	58	15.5	35
Erie (inc. Chic. & Erie)	1922	2,259	919,950	1,047,472	58,437	28,185	65.8	1,712,226	807,760	546	221	28.8	30
	1921	2,259	854,150	976,717	48,517	23,733	58.5	1,575,534	713,463	570	129	18.3	1
Lehigh Valley	1922	1,430	536,752	594,956	67,491	15,151	66.1	907,383	427,151	402	140	25.8	106
	1921	1,431	504,204	564,407	52,362	12,822	62.6	812,591	390,497	406	133	24.7	93
Michigan Central	1922	1,827	480,395	487,707	20,001	14,187	63.1	788,062	312,256	315	95	23.1	76
	1921	1,829	422,784	437,829	16,613	10,991	58.0	653,559	265,231	346	74	17.5	107
New York Central	1922	5,655	1,781,246	1,992,987	129,150	58,834	61.6	3,503,642	1,516,988	1,092	505	31.6	253
	1921	5,646	1,679,905	1,850,209	130,096	48,583	55.9	3,087,178	1,300,829	1,043	516	33.1	171
N. Y., Chic. & St. L.	1922	510	336,817	338,356	792	10,354	65.5	555,511	225,757	123	31	20.2	42
	1921	510	312,491	314,311	181	8,243	63.0	454,291	183,641	109	61	36.0	29
Pere Marquette	1922	2,191	297,672	307,783	6,490	7,469	66.1	438,924	169,537	153	54	26.0	21
	1921	2,207	234,952	240,086	4,091	5,299	62.3	278,807	131,961	172	34	16.7	34
Pitts. & Lake Erie	1922	228	95,046	100,360	666	3,108	58.2	228,738	125,946	59	20	25.5	8
	1921	225	101,452	114,382	1,128	2,907	58.1	216,515	118,686	67	14	17.0	13
Wabash	1922	2,418	607,432	642,481	7,890	15,816	59.7	874,279	396,186	263	76	22.4	9
	1921	2,418	471,060	500,007	3,970	12,672	68.2	692,284	301,907	270	65	19.3	34
Ohio-Indiana-Allegheny Region:													
Baltimore & Ohio	1922	5,235	1,638,005	1,921,443	148,436	41,097	53.1	2,656,068	1,335,192	912	479	34.4	107
	1921	5,185	1,524,400	1,910,327	102,728	32,702	55.5	2,235,122	1,026,686	1,058	303	22.3	198
Central of N. J.	1922	689	275,072	309,831	40,141	5,728	56.1	395,102	194,954	218	38	14.9	10
	1921	678	247,323	270,085	28,611	4,945	56.7	351,384	175,293	262	62	23.6	14
Chicago & Eastern Ill.	1922	945	209,002	210,622	3,178	5,042	61.6	316,505	159,969	117	50	29.9	33
	1921	1,131	207,296	208,749	4,431	4,569	58.0	293,417	143,335	107	66	37.9	11
C., C., C. & St. L.	1922	2,387	662,316	698,447	6,150	17,920	57.1	1,185,332	547,725	319	128	28.6	16
	1921	2,396	587,353	618,304	2,188	13,779	54.3	933,291	377,906	314	117	27.1	50
Elgin, Joliet & Eastern	1922	840	102,214	115,629	7,652	2,949	63.0	227,959	122,139	96	12	11.2	28
	1921	837	112,555	122,895	7,698	3,063	65.4	238,965	131,106	102	9	8.2	10
Long Island	1922	394	38,081	41,021	6,654	426	60.6	24,250	9,342	38	9	19.7	2
	1921	395	36,584	41,470	7,343	425	64.4	22,555	8,987	34	7	16.6	3
Pennsylvania System	1922	10,882	4,120,605	4,512,155	345,460	101,980	61.7	7,040,286	3,504,507	2,548	884	25.8	494
	1921	10,869	3,761,358	4,137,079	312,112	83,282	58.6	5,899,087	2,907,842	2,317	844	26.7	485
Phila. & Reading	1922	1,119	554,431	621,532	76,186	13,284	61.2	924,779	488,730	349	78	18.2	125
	1921	1,119	489,631	560,276	74,107	11,099	59.1	790,879	415,046	347	89	20.5	87
Pocahontas Region:													
Chesapeake & Ohio	1922	2,548	766,212	861,572	19,558	21,914	57.1	1,727,208	938,567	453	107	19.2	56
	1921	2,543	587,141	640,327	19,226	15,072	54.4	1,147,897	585,329	406	155	27.7	84
Norfolk & Western	1922	2,228	739,523	898,226	33,700	20,583	57.3	1,610,593	872,349	600	105	14.9	206
	1921	2,210	571,828	696,520	24,271	14,329	58.2	1,089,423	571,135	478	203	29.8	141
Southern Region:													
Atlantic Coast Line	1922	4,924	642,368	651,331	10,095	14,261	58.6	762,727	265,862	289	103	26.2	25
	1921	4,889	625,191	630,409	11,231	13,436	61.3	720,670	272,832	282	132	31.9	2
Central of Georgia	1922	1,908	188,671	189,126	2,834	4,340	75.7	210,416	94,127	107	27	19.9	11
	1921	1,908	210,896	212,570	2,185	4,106	70.2	231,515	110,429	102	24	19.0	...
I. C. (inc. Y. & M. V.)	1922	6,137	1,578,166	1,585,438	33,432	41,028	62.4	2,605,125	1,200,824	757	81	9.7	27
	1921	6,151	1,508,839	1,517,942	31,813	34,625	62.6	2,261,312	1,048,935	732	110	13.1	13
Louisville & Nashville	1922	5,021	1,420,177	1,512,419	58,154	25,103	58.9	1,661,297	786,877	573	98	14.6	27
	1921	5,026	1,331,202	1,422,891	46,681	20,948	59.5	1,359,816	636,202	545	105	16.2	4
Seaboard Air Line	1922	3,537	395,152	404,981	7,829	8,554	65.2	455,208	171,957	173	72	29.4	...
	1921	3,537	422,350	428,723	8,969	8,444	60.6	476,858	178,718	174	78	30.9	...
Southern Ry	1922	6,942	1,143,529	1,167,561	28,881	24,689	67.3	1,299,699	542,503	853	253	22.9	27
	1921	6,942	1,129,047	1,150,060	24,109	22,529	67.4	1,215,793	523,116	884	240	21.3	70
Northwestern Region:													
C. & N. W.	1922	8,391	1,412,292	1,453,860	18,115	27,117	62.5	1,596,954	663,442	807	226	21.9	24
	1921	8,320	1,394,473	1,434,977	18,093	24,765	59.5	1,492,786	675,825	639	319	33.3	2
C., M. & St. P.[1]	1922	11,027	1,446,957	1,496,665	63,944	32,263	65.0	1,838,002	862,788	839	206	19.7	82
	1921	10,694	1,191,867	1,232,855	61,470	26,000	61.1	1,481,664	640,780	677	360	34.7	70
C., St. P., M. & O.	1922	1,726	279,694	304,580	14,988	4,728	69.3	253,376	109,828	149	63	29.7	22
	1921	1,726	294,543	313,226	13,154	4,882	64.6	273,580	111,630	152	52	25.5	27
Great Northern	1922	8,265	686,792	709,801	27,373	15,735	70.8	885,415	422,112	581	177	23.4	181
	1921	8,171	618,104	636,792	23,085	14,790	71.3	824,007	401,690	589	180	23.4	245
M., St. P. & S. Ste. M.	1922	4,384	360,468	392,376	7,655	7,237	73.7	360,456	168,501	341	63	15.7	35
	1921	4,225	423,190	429,672	6,552	8,379	68.0	441,263	212,940	341	66	16.2	51
Northern Pacific	1922	6,414	681,178	712,735	45,809	17,194	74.6	935,625	457,871	541	152	21.9	90
	1921	6,408	588,202	616,966	41,955	15,495	70.4	872,781	423,627	547	157	22.3	168
Oreg.-Wash. R. R. & Nav.	1922	2,166	183,202	208,904	28,795	4,446	70.7	259,298	125,235	125	37	22.7	2
	1921	2,196	167,305	185,344	23,319	4,014	74.5	220,232	110,073	121	41	25.3	4
Central Western Region:													
Atch., Top. & Santa Fe	1922	9,298	1,203,323	1,256,278	56,015	30,180	66.5	1,522,404	586,385	800	179	18.2	232
	1921	9,771	1,356,358	1,415,535	64,772	30,311	57.2	1,876,664	700,514	682	250	26.8	62
Chicago & Alton	1922	1,010	337,966	342,933	5,223	6,863	60.2	439,430	206,429	109	41	27.3	4
	1921	1,010	295,609	300,876	5,245	5,492	54.7	359,947	154,667	108	47	30.3	7
Chic., Burl. & Quincy	1922	9,326	1,432,790	1,497,557	67,557	36,488	63.0	2,221,848	1,061,044	696	259	27.1	88
	1921	9,322	1,368,698	1,429,314	64,969	32,580	61.1	2,025,479	956,564	680	268	28.3	69
Chic., Rock Isl. & Pacific	1922	7,662	1,161,251	1,180,184	9,124	24,406	67.7	1,344,500	596,636	589	171	22.5	61
	1921	7,662	1,128,248	1,148,314	8,968	22,481	66.0	1,225,402	521,284	581	179	23.6	41
Denv. & Rio Grande West	1922	2,593	194,969	241,145	48,452	4,163	66.9	251,096	122,786	241	67	21.8	43
	1921	2,585	183,228	227,361	43,785	3,725	67.1	222,651	110,601	227	79	25.8	43
Oregon Short Line	1922	2,360	309,350	325,115	22,681	6,675	64.8	423,429	199,900	170	51	23.2	27
	1921	2,359	251,590	262,836	19,616	5,462	65.2	333,239	159,598	177	49	21.7	32
Southern Pacific	1922	6,984	803,856	922,974	163,866	22,523	70.3	1,245,918	537,475	532	205	27.8	38
	1921	6,975	901,544	1,038,145	190,050	22,922	63.7	1,364,684	573,776	554	184	24.9	35
Union Pacific	1922	3,665	808,295	820,816	34,922	22,172	72.2	1,209,706	548,162	412	126	23.4	93
	1921	3,614	648,582	662,164	40,547	17,907	65.8	1,007,572	438,390	399	154	27.8	74
Southwestern Region:													
Gulf, Colo. & Santa Fe	1922	1,895	181,678	188,232	3,464	4,671	64.2	270,048	116,895	123	27	18.0	40
	1921	1,895	246,078	251,433	5,671	5,494	60.4	330,099	143,679	101	37	26.8	...
Missouri, Kans. & Tex.	1922	1,666	176,537	176,674	3,512	4,638	58.2	271,639	104,820	143	42	22.6	77
	1921	1,710	208,153	208,240	7,962	5,039	58.4	296,709	118,290	127	51	28.7	38
Mo., Kans & Tex. of Tex.	1922	1,738	167,690	171,933	1,910	3,421	60 6	201,113	80,920	87	48	35.5	19
	1921	1,740	238,497	242,762	2,900	4,292	57.5	269,076	110,504	110	42	27.5	17
Missouri Pacific	1922	7,264	974,860	984,823	28,043	23,255	68.3	1,316,624	608,315	436	152	25.9	5
	1921	7,261	963,704	970,897	33,753	20,660	66.1	1,185,417	531,523	361	174	32.5	...
St. Louis-San Francisco.	1922	4,761	658,119	667,100	11,513	12,033	65.1	685,231	295,361	347	109	24.0	30
	1921	4,761	719,784	728,275	11,563	11,639	61.8	684,489	284,426	342	143	29.5	28
Southern Pacific Lines (in. Texas and Louisiana)	1922	3,710	487,179	489,586	3,270	9,835	64.3	583,951	257,364	195	97	33.2	13
	1921	3,647	610,985	618,968	6,172	11,240	56.8	738,348	317,775	186	100	35.0	...
Texas & Pacific	1922	1,953	227,661	227,763	1,792	5,221	64.3	290,293	112,786	123	85	40.8	22
	1921	1,947	291,380	291,423	2,914	5,832	60.2	346,490	135,212	114	76	40.1	4

[1] Includes Chicago, Terre Haute & Southeastern from July 1, 1921, only.

Compiled by the Bureau of Statistics of the Interstate Commerce Commission. Subject to revision.

Compared with February, 1921, for Roads with Annual Operating Revenues above $25,000,000.

Region, road and year	Average number of freight cars on line daily: Home	Foreign	Total	Per cent unserviceable	Stored	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car-miles per car-day	Net-ton miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotive and tender	Passenger service: Train-miles	Passenger-train car-miles
New England Region:														
Boston & Albany	1922	3,735	4,768	8,503	6.1	1,177	946	382	21.1	391	27.6	8,431	222	274,553	1,724,009
	1921	3,178	4,681	7,859	6.4	1,350	914	373	23.3	408	28.6	8,131	233	285,359	1,765,969
Boston & Maine	1922	17,075	14,600	31,675	18.6	902	1,084	452	21.7	260	17.1	3,348	173	733,908	3,921,192
	1921	15,721	15,500	31,221	15.0	2,244	1,048	462	24.6	261	15.6	3,306	182	779,707	4,067,156
N. Y., N. H. & H.	1922	24,083	16,049	40,132	23.4	1,210	1,253	541	22.0	193	12.7	3,958	177	895,624	5,486,065
	1921	23,079	17,595	40,674	14.4	4,911	1,148	509	24.0	176	11.0	3,630	212	979,198	5,877,262
Great Lakes Region:														
Delaware & Hudson	1922	10,546	5,646	16,192	8.5	437	1,626	825	34.2	666	31.1	12,162	201	172,072	857,901
	1921	9,784	7,868	17,652	8.2	321	1,589	774	35.0	592	29.8	11,874	218	168,117	848,607
Del., Lack. & Western	1922	16,003	6,151	22,154	13.6	.....	1,531	692	24.1	531	32.2	11,841	218	442,148	3,059,466
	1921	15,909	7,255	23,164	8.7	3,511	1,547	717	26.7	495	28.4	11,540	202	440,794	3,106,290
Erie (inc. Chic. & Erie)	1922	40,358	17,585	57,943	19.9	7,852	1,861	878	28.7	498	26.4	12,771	162	607,063	4,216,303
	1921	31,475	20,618	52,093	12.7	9,370	1,845	835	30.1	489	27.8	11,281	177	604,461	4,458,459
Lehigh Valley	1922	30,900	9,443	40,343	12.7	4,023	1,691	796	28.2	378	20.3	10,664	186	312,941	2,283,663
	1921	27,452	11,365	38,817	9.6	2,686	1,612	774	30.5	359	18.8	9,748	196	330,968	2,456,578
Michigan Central	1922	17,876	13,555	31,431	18.2	1,607	1,640	650	22.0	335	25.5	6,105	143	495,130	4,371,320
	1921	16,730	12,495	29,225	11.2	1,464	1,546	627	24.1	324	23.2	5,178	155	518,334	4,458,309
New York Central	1922	82,996	45,871	128,867	21.0	6,950	1,967	851	25.8	420	26.5	9,574	136	2,119,866	16,232,814
	1921	78,864	60,757	139,621	9.2	21,854	1,838	774	26.8	333	22.2	8,228	150	2,156,578	16,157,346
N. Y., Chic. & St. L.	1922	4,634	5,110	9,744	8.5	1,060	1,649	670	21.8	827	57.9	15,802	119	78,370	435,437
	1921	5,144	4,616	9,760	14.6	845	1,454	588	22.3	672	47.8	12,854	134	79,365	454,787
Pere Marquette	1922	10,658	9,352	20,010	15.0	1,200	1,475	570	22.7	303	20.2	2,763	138	246,632	1,145,722
	1921	9,700	7,135	16,835	9.5	2,000	1,187	562	24.9	280	18.0	2,135	189	259,700	1,219,586
Pitts. & Lake Erie	1922	20,572	7,070	27,642	45.5	670	2,407	1,325	40.5	163	6.9	19,735	82	100,122	497,134
	1921	13,664	10,424	24,088	11.8	3,612	2,134	1,170	40.8	176	7.4	18,870	90	104,932	520,152
Wabash	1922	12,373	9,764	22,137	13.1	545	1,439	652	25.0	639	36.6	5,852	176	494,648	2,508,488
	1921	12,307	10,310	22,617	10.8	784	1,470	641	23.8	477	29.3	4,460	188	490,733	2,469,594
Ohio-Indiana-Allegheny Region:														
Baltimore & Ohio	1922	70,797	30,564	101,361	16.3	8,212	1,622	815	32.5	470	23.0	9,109	201	1,305,509	8,033,139
	1921	64,993	38,059	103,052	7.2	5,718	1,466	674	31.4	356	20.4	7,072	221	1,246,118	7,810,727
Central of N. J.	1922	20,572	7,861	28,433	5.5	7,995	1,436	709	34.0	245	12.8	10,107	185	301,023	1,411,194
	1921	16,542	10,456	26,998	19.9	2,914	1,421	709	35.4	232	11.5	9,228	192	290,412	1,239,218
Chicago & Eastern Ill.	1922	15,662	3,204	18,866	13.4	3,425	1,514	765	31.7	303	15.5	6,045	191	199,920	1,310,953
	1921	15,905	3,240	19,145	11.2	....	1,415	691	31.4	267	14.7	4,526	207	218,359	1,384,118
C., C., C. & St. L.	1922	16,495	17,671	34,166	12.5	2,036	1,787	827	30.6	573	32.8	8,196	149	619,552	3,801,262
	1921	17,717	18,095	35,812	11.1	7,005	1,589	643	27.4	377	25.3	5,632	159	689,676	4,166,020
Elgin, Joliet & Eastern	1922	10,374	2,937	13,311	9.9	611	2,230	1,195	41.4	328	12.4	5,196	155	(1)	(1)
	1921	10,271	5,113	15,384	6.1	1,627	2,123	1,165	42.8	304	10.9	5,597	165	(1)	(1)
Long Island	1922	2,289	3,338	5,627	5.3	411	637	245	21.9	59	4.5	846	389	170,298	910,935
	1921	1,565	3,595	5,160	4.7	257	617	246	21.1	62	4.6	813	419	171,661	894,055
Pennsylvania System	1922	218,726	68,324	287,050	12.1	44,440	1,709	850	34.4	436	20.6	11,502	155	4,519,111	28,990,506
	1921	192,031	81,308	273,339	4.9	73,110	1,568	773	34.9	380	18.6	9,555	171	4,662,823	30,304,830
Phila. & Reading	1922	24,717	13,685	38,402	5.5	2,223	1,668	882	36.8	455	20.2	15,594	188	437,804	1,996,601
	1921	24,669	15,115	39,784	8.9	2,889	1,615	848	37.4	373	16.9	13,249	223	476,339	2,107,087
Pocahontas Region:														
Chesapeake & Ohio	1922	36,435	12,869	49,304	13.7	813	2,254	1,225	42.8	680	27.8	13,155	138	401,144	2,143,553
	1921	34,239	15,177	49,416	6.5	17,700	1,955	997	38.8	423	20.0	8,222	163	402,436	2,205,304
Norfolk & Western	1922	30,835	6,577	37,412	7.2	1,053	2,178	1,180	42.4	833	34.3	13,985	179	357,098	2,111,190
	1921	35,239	9,947	45,186	6.7	10,794	1,905	999	39.9	451	19.5	9,230	198	353,454	2,184,433
Southern Region:														
Atlantic Coast Line	1922	23,557	9,803	33,360	12.7	.....	1,187	414	18.6	284	26.1	1,928	128	781,485	5,600,007
	1921	21,927	12,683	34,610	11.1	.....	1,152	436	20.4	281	22.6	1,993	148	792,966	5,550,992
Central of Georgia	1922	4,592	2,789	7,831	16.7	.....	1,115	499	21.7	455	27.7	1,762	158	291,728	1,540,581
	1921	4,538	4,070	8,608	16.5	.....	1,098	524	26.5	458	24.6	2,067	180	291,509	1,486,114
I. C. (inc. Y. & M. V.)	1922	44,556	22,631	67,187	7.8	8,063	1,651	761	29.3	638	34.9	6,989	156	1,313,908	7,617,285
	1921	42,623	20,641	63,264	5.9	10,569	1,499	695	30.3	592	31.2	6,090	163	1,307,844	7,450,308
Louisville & Nashville	1922	37,553	13,991	51,544	12.7	78	1,170	554	31.3	545	29.5	5,597	178	932,056	5,292,980
	1921	36,219	18,683	54,902	17.3	112	1,022	478	30.4	414	22.9	4,520	206	885,260	4,928,660
Seaboard Air Line	1922	12,986	9,713	22,699	30.9	.....	1,152	435	20.1	271	20.6	1,736	194	585,042	3,874,031
	1921	10,662	10,338	21,000	15.0	.....	1,129	423	21.2	304	23.7	1,804	194	567,905	3,478,662
Southern Ry	1922	41,202	17,674	58,876	15.7	3,022	1,137	474	22.0	329	22.2	2,791	211	1,179,491	6,645,649
	1921	35,893	26,368	62,261	7.8	12,117	1,077	463	23.2	300	19.2	2,691	226	1,269,622	7,765,536
Northwestern Region:														
C. & N. W.	1922	45,770	25,639	71,409	7.4	7,000	1,131	470	24.5	332	21.7	2,824	211	1,413,891	8,438,766
	1921	45,683	25,262	70,945	6.8	3,600	1,071	485	27.3	340	20.9	2,901	209	1,538,657	8,990,398
C., M. & St. P.[1]	1922	49,582	25,861	75,443	15.8	.....	1,270	596	26.7	408	23.2	2,794	203	1,318,091	7,769,171
	1921	41,780	20,852	62,632	8.7	4,869	1,243	538	24.6	365	24.3	2,158	194	1,322,587	7,975,226
C., St. P., M. & O.	1922	3,547	11,159	14,706	13.1	425	906	393	23.2	267	16.6	2,272	205	270,049	1,494,650
	1921	3,300	11,154	14,454	11.3	1,414	929	379	22.9	276	18.7	2,309	205	291,309	1,626,784
Great Northern	1922	46,190	5,554	51,744	12.5	.....	1,289	615	26.8	291	15.3	1,824	218	883,202	5,004,901
	1921	43,252	11,968	55,220	12.1	.....	1,333	650	27.2	260	13.4	1,756	201	903,896	5,356,085
M., St. P. & S. Ste. M.	1922	19,002	4,768	23,770	12.1	1,333	1,000	468	23.3	253	14.8	1,373	185	369,593	1,998,239
	1921	15,923	9,473	25,396	11.1	1,697	1,043	503	25.4	299	17.3	1,799	153	397,147	2,042,417
Northern Pacific	1922	36,777	6,784	43,561	10.1	1,673	1,374	672	26.6	375	18.9	2,550	175	751,806	4,634,138
	1921	34,760	12,213	46,973	10.4	12,554	1,484	720	27.3	322	16.7	2,361	153	765,757	4,676,736
Oreg.-Wash. R. R. & Nav.	1922	5,876	3,344	9,220	3.1	3,017	1,415	684	28.2	485	24.3	2,065	246	232,072	1,494,842
	1921	3,769	4,373	8,142	9.9	2,473	1,316	658	27.4	483	23.6	1,791	233	234,906	1,548,240
Central Western Region:														
Atch., Top. & Santa Fe	1922	50,037	11,807	61,844	7.5	11,775	1,265	487	19.4	339	26.2	2,137	178	1,565,338	11,625,508
	1921	47,330	16,062	63,392	9.0	10,820	1,384	516	23.1	395	29.9	2,561	164	1,716,638	12,449,369
Chicago & Alton	1922	9,937	5,669	15,606	3.7	846	1,300	611	30.1	472	26.1	7,298	204	247,511	1,414,845
	1921	8,388	6,316	14,704	4.4	92	1,218	523	28.2	376	24.4	5,468	221	267,802	1,498,508
Chic., Burl. & Quincy	1922	45,485	18,667	64,152	9.5	160	1,551	741	29.1	591	32.2	4,063	179	1,310,640	8,053,456
	1921	44,891	22,699	67,590	9.4	.....	1,480	699	29.4	505	28.2	3,665	180	1,386,527	8,828,555
Chic., Rock Isl. & Pacific	1922	33,450	13,306	46,756	10.5	6,304	1,158	514	24.4	456	27.5	2,781	194	1,173,677	6,516,935
	1921	29,913	18,236	48,149	9.8	10,064	1,086	462	23.2	387	25.3	2,430	198	1,227,154	6,945,224
Denver & Rio Grande Western	1922	12,778	3,447	16,225	12.8	1,834	1,288	630	29.5	270	13.7	1,691	234	205,356	1,261,763
	1921	12,072	3,467	15,539	6.9	2,195	1,215	604	29.7	254	12.8	1,528	257	204,646	1,320,664
Oregon Short Line	1922	6,830	3,820	10,650	7.0	952	1,369	616	29.9	670	34.6	3,025	164	259,307	1,767,071
	1921	7,870	4,689	12,559	6.2	2,965	1,325	634	29.2	454	23.8	2,416	171	269,550	1,881,139
Southern Pacific	1922	23,394	16,808	40,202	7.0	6,051	1,550	669	23.9	477	28.3	2,749	167	1,184,099	9,065,742
	1921	18,650	20,454	39,104	8.0	2,482	1,514	636	25.0	524	32.7	2,938	167	1,354,611	10,169,058
Union Pacific	1922	17,758	6,844	24,602	14.7	3,142	1,497	678	24.7	796	44.6	5,341	171	777,665	6,007,824
	1921	17,912	9,666	27,578	13.7	5,868	1,553	676	24.5	568	35.2	4,332	185	780,618	6,284,276
Southwestern Region:														
Gulf, Colo. & Santa Fe	1922	8,550	3,376	12,226	4.1	1,917	1,486	643	25.0	342	21.3	2,204	148	174,810	960,225
	1921	8,006	5,158	13,164	4.3	2,803	1,342	584	26.2	390	24.7	2,709	158	176,065	1,012,435
Missouri, Kans. & Tex.	1922	9,027	5,029	14,056	5.4	5,532	1,539	594	22.6	266	20.3	2,247	158	241,466	1,748,103
	1921	8,126	5,182	13,308	8.4	2,978	1,425	568	23.5	317	23.2	2,470	162	259,482	2,041,074
Mo., Kans. & Tex. of Tex.	1922	307	11,150	11,457	7.4	3,975	1,199	483	23.7	252	17.6	1,663	166	242,625	1,432,633
	1921	242	12,881	13,123	4.0	1,090	1,128	463	25.7	301	20.3	2,268	177	256,016	1,758,431
Missouri Pacific	1922	32,920	18,168	51,088	9.2	2,770	1,351	624	26.2	425	23.8	2,991	174	855,824	4,964,200
	1921	31,126	22,601	53,727	6.0	3,835	1,230	552	25.7	353	20.8	2,614	176	852,092	5,002,931
St. Louis-San Francisco	1922	20,903	7,788	28,691	8.5	.....	1,041	449	24.5	368	23.0	2,216	204	676,310	3,738,253
	1921	19,581	12,883	32,464	7.4	.....	951	395	24.4	313	20.7	2,134	225	712,538	4,007,513
Southern Pacific Lines (In Texas and Louisiana)	1922	9,409	13,948	23,357	13.4	2,539	1,199	528	26.2	394	23.4	2,447	138	487,033	3,172,930
	1921	7,512	19,670	27,182	10.4	3,124	1,208	520	28.3	418	26.0	3,112	159	491,032	3,214,232
Texas & Pacific	1922	6,663	4,786	11,449	17.7	.....	1,275	495	21.6	352	25.3	2,063	159	268,490	1,746,847
	1921	5,423	7,444	12,867	12.3	.....	1,189	464	23.2	375	26.9	2,481	171	288,156	1,901,843

[1] Includes Chicago, Terre Haute & Southeastern from July 1, 1921, only.

Tentative Valuation Hearings

The Interstate Commerce Commission has announced a series of hearings before examiners at Washington on protests which have been filed against tentative valuation reports. On May 18 the hearing will be on the St. Louis-Southwestern case and on May 25 there will be hearings on the Green Bay & Western and the Chicago, Rock Island & Pacific.

Railway Labor Disputes and the Federal Power

A discussion of the "use of federal power in railway labor disputes," by Clyde O. Fisher, assistant professor of economics at Wesleyan University, has been issued by the United States Department of Labor as Bulletin No. 303. It discusses the experience of this country in the development of governmental authority in the settlement of railway disputes. The law of 1888, providing for voluntary arbitration, the Erdman Act, the Newlands Act, the Adamson law, and the Esch-Cummins law are set forth, with the reactions of the different factions, that is, the unions, the railroad operators, and the public.

Cross Crossings Cautiously

The board of directors of the American Railway Association has decided to promote, from June 1 to September 30, a "Careful Crossing Campaign" with a view to impressing on everybody the thought expressed in the title of this paragraph.

Uniform colored posters have been designed and will be furnished at cost. The co-operation of the National Automobile Chamber of Commerce, the National Safety Council, and other organizations has been secured. The plan of campaign will be discussed at the annual meeting of the Safety Section in Chicago, on May 3, 4 and 5, and Safety officers of member railroads are urged to be present.

Twenty Thousand, Plus

The Pennsylvania Railroad Employees' general athletic exhibition takes place at Columbus, Ohio, April 22 and the number expected to attend is 20,000, besides women and children. There will be more than 1,500 contestants, including individuals and teams will compete at Columbus, Ohio, on April 22 in the Pennsylvania System indoor championships. Through the co-operation of the Columbus Chamber of Commerce, the Coliseum, which seats 7,000, and the Ohio State fair grounds will be placed at the disposal of the railroad men free of charge. Swimming events will be contested in the 60-foot pool of the Columbus Athletic Club. Women employees will compete in basket ball, volley ball, duck and ten pins, and 50 and 75 yard dashes. There will be indoor baseball, pocket billiards, trap shooting, boxing, wrestling, horse shoes, quoits, shuffle board, and rifle shooting.

H. A. Miller, sporting editor of "The Columbus Evening Dispatch" will give a loving cup to the individual scoring the most points in the track and field events, and "the Deshler trophy" offered by Dr. A. L. Wallick, will be presented to the bowler who rolls the highest score in a single game. P. F. Neff will referee the meet, assisted by I. W. St. John, director of athletics of Ohio State University. E. J. Hughes is chairman of the local committee of Columbus employees in charge of arrangements.

President Markham Pays Tribute to Labor Board

That the United States Railroad Labor Board has done remarkably well in the face of the serious obstacles with which it is confronted is the opinion of C. H. Markham, president of the Illinois Central, as expressed in an address at a dinner of the St. Louis Association of Commerce, on April 14. Mr. Markham said, in part:

"The Railroad Labor Board, which was created by the Transportation Act, has been the object of considerable censure, and that censure has come alike from railway executives, railway workers and the public. Considering all the obstacles which the board has faced during the trying two years since it was created, I believe it has done remarkably well. Generally speaking, its decisions have been accepted and lived up to by the railroads and the employees, although questions of jurisdiction have made it appear that some of the roads have not accepted all its findings in good faith, and there was a short period last fall when some groups of employees flaunted a decision of the board with a strike threat. However, the public members of the board were able to smooth out the difficulty, and the strike was averted. The three representatives of the public group hold the balance of power. I believe that they have tried to deal fairly with all questions brought before the board, and that they have had a wholesome influence in making the board a respected public body."

Canadian Pacific Memorial in New York

One of the massive bronze tablets recently made for the Canadian Pacific Railway to perpetuate the memory of the employees of the road who gave their lives in the great war has been put up on the company's building at 44th street and Madison avenue, New York city. The number of employees who made the supreme sacrifice was 1,100 and the wording of the inscription is given below. The tablet is 50 in. wide and 40 in. high, and weights 270 lb.

At the top of the tablet Britannia calls to her sons; at the left there is a battleship and a tank, at the right a Canadian Pacific locomotive and a steamship, and below these advancing artillery and infantry. At the bottom are the names of the battles in which the Canadians fought and died, from Ypres through the terrible years to Mons

In all 11,062 Canadian Pacific men served "king and country"; 2,088 were wounded and about 19,000 former soldiers are now employed by the company. Replicas of this tablet are being placed in all the principal Canadian Pacific offices in Canada and in its offices in London, Liverpool and other cities. The tablet was designed by Archibald Pearce, of the railway's engineering department, and was engraved by the Bromsgrove Guild, Worcestershire, England.

> THIS TABLET COMMEMORATES THOSE IN THE SERVICE OF THE CANADIAN PACIFIC RAILWAY COMPANY WHO AT THE CALL OF KING AND COUNTRY LEFT ALL THAT WAS DEAR TO THEM, ENDURED HARDSHIP, FACED DANGER AND FINALLY PASSED OUT OF SIGHT OF MEN BY THE PATH OF DUTY AND SELF SACRIFICE, GIVING UP THEIR OWN LIVES THAT OTHERS MIGHT LIVE IN FREEDOM. LET THOSE WHO COME AFTER SEE TO IT THAT THEIR NAMES BE NOT FORGOTTEN.

Air Brake Association Transfers Convention from Washington, May 9, to Atlantic City, June 19

The executive committee of the Air Brake Association after careful consideration has decided to transfer the twenty-ninth annual convention from Washington, D. C., May 9-12, to Atlantic City, June 19-21. This change is made at the eleventh hour because of the culmination at this time of plans which have been developing during the past two or three years for the closer affiliation of the Air Brake Association with the Mechanical Division of the American Railway Association.

This change of convention place and time is decidedly advantageous to the Air Brake Association in that it now makes possible a closer co-operation with the work of the Train Brake and Signal Committee of the American Railway Association. The identity and individuality of the Air Brake Association is to be retained. The officers, membership and activities will be the same as formerly with no change in constitution or by-laws. The association will continue to be a distinctly educational organization working for improvements in air brake practices and a higher standard of maintenance.

Convention headquarters will be at Haddon Hall, conveniently situated on the boardwalk, where a spacious convention hall and ample room for exhibits have been secured. In addition to accommodations at Haddon Hall, special rates on the American plan have been obtained at Hotel Bothwell, Hotel Wiltshire and Avon Inn.

The usual exhibits of the Air Brake Appliance Association will be displayed at Haddon Hall and are entirely distinct from the extensive Railway Supply Manufacturers' Association exhibit of railway machinery at Young's Million Dollar Pier, which will be

open to all members. Full participation in the entertainments of the A. R. A. Mechanical Division will be afforded members of the Air Brake Association and their families. This includes the grand carnival ball on the Pier, Monday, June 19, and the grand ball Tuesday evening. Free roller chairs will be available on the boardwalk for members from 9 a. m. to 5 p. m.

A. R. A. Recommends New Interchange Practice

The recommendation of the Joint Committee on Interchange of Equipment of the American Railway Association relative to joint interchange inspection of equipment, which was submitted to a letter ballot of the Association, has been approved by a vote of 303 to 14, with 81 not voting.

The recommendation, which follows, has been adopted by the A. R. A. as recommended practice.

It is the opinion of the Joint Committee that special rules of general application covering joint inspection of equipment in interchange cannot be formulated for the reason that local conditions must govern; that existing A. R. A. rules will enable interested roads to agree on inspection of equipment.

It is, therefore, suggested in the interest of economy in operation and to facilitate the movement of cars, that where inspection of equipment is involved at any point of interchange, that the interested roads arrange for conference to study conditions at that point. The following principles to govern any arrangements which may be adopted: 1.—Observance of A. R. A. rules. 2.—No backward movement of cars. 3.—No duplicate interchange inspection of cars. 4.—No delay to cars due to inspection in order to fix responsibility for damage to cars, adjustment or transfer of lading.

There are various forms of interchange inspection which can be adapted to these principles, some of which are outlined below:

A.—JOINT INSPECTION—Where all of the inspectors are joint men under a chief joint inspector.

B.—INSPECTION UNDER THE JURISDICTION OF AN ARBITRATOR—Where inspectors are in the employ of various railroads under the jurisdiction of an arbitrator, whose duty it is to harmonize and unify inspections and settle any disputes which may arise without holding cars or lading for this purpose.

C.—DELIVERING LINE INSPECTION—Where interested roads accept the delivering line inspection.

D.—RECEIVING LINE INSPECTION—Where interested roads accept the receiving line inspection and handle each other's defect cards.

E.—INSPECTION BY RECEIVING LINE'S INSPECTORS IN DELIVERING LINE'S YARD—Where receiving line inspectors make inspection in delivering line's yard.

F.—JOINT INSPECTION AND REPAIRS—Where a single organization in a joint terminal makes all inspections and repairs for the interested roads.

Value of Education in Railroading

Samuel Rea, president of the Pennsylvania Railroad, replying to an inquirer, says that the man graduating from college and entering the railway business *is* likely to advance more rapidly than the man of his age who lacks college training. Other things being equal, the college man will go ahead faster and get farther than the man who lacks that great initial advantage.

"In the technical branches of railroading we have reached the point where the preliminary training of a college or a university course is no longer looked upon merely as an advantage, but has become, practically speaking, a necessity for the young man who aims at a place in the executive forces. Of 163 principal officers and directors of the Pennsylvania System, 86 are college graduates and 77 not. Superficially, that does not look like a very striking preponderance in favor of the college men; but for every hundred men entering the railroad service with a college education, there are thousands who start without one.

"As to the best lines of training the statistics leave no doubt that they are civil and mechanical engineering, particularly the former. Out of the list of 163 men just mentioned, 81 are officers of the operating department, and, of the 81, no less than 54, or exactly two-thirds, are college-trained men; and out of the 54 college graduates, 38 are civil engineers, eleven are mechanical engineers, one is an electrical engineer, and four are graduates of the academic departments. If we confined our study to the younger operating officers, we should find that nearly 100 per cent are college graduates. For a number of years past it has been a rule of the company that graduates of recognized colleges or universities in civil, mechanical or electrical engineering, or their equivalents, be given preference for development into operating officers.

"In the other departments—traffic, accounting, purchasing, financial, insurance, real estate, legal, and the secretary's staff—the training received in a scientific course is not of direct advantage; but the training of an academic course gives young men entering those departments as much relative advantage as it would in the corresponding departments of any other large business. Ten of the Pennsylvania's leading traffic officers are graduates in academic courses.

"Comparatively few young men who have specialized in economics at college seem to have entered the railroad business, but there should be a good field for them in the non-operating departments.

"I would not advise any young man whose principal conception of success was to become rich, or quickly to obtain a very large salary, to enter the railroad business. The period of adventure and pioneering in the railroad enterprise has now passed, and the firm establishment of public regulation as a definite policy tends to remove railroading almost wholly from the realm of speculative enterprise. As a result, the work of the railroad officer has become one of the most highly stabilized of the professions, from the viewpoint of remuneration and certainly of employment. To a young man of ability, about to graduate from college, and confronted with a choice of professions, I would, therefore, say that railroading offers a more certain career than most branches of commerce or industry, with less likelihood of suffering through the mistakes or wrongs of others and also with somewhat less probability of gaining the very highest monetary return."

Exhibitors at Atlantic City Conventions

The following list shows the names of the firms which have thus far been allotted space by the Railway Supply Manufacturers' Association for the exhibit which will be held on the Million Dollar Pier at Atlantic City during the meetings of Division V—Mechanical, and Division VI—Purchases and Stores, American Railway Association, June 14-21. This list compares favorably with similar lists published at this time for the exhibits of previous years.

Air Reduction Sales Co., New York.
Ajax Manufacturing Co., Cleveland, Ohio.
Allegheny Steel Co., Pittsburgh, Pa.
American Abrasive Metals Co., New York.
American Arch Co., Inc., New York.
American Automatic Connector Co., Cleveland, Ohio.
American Brake Shoe & Foundry Co., New York.
American Car & Foundry Co., New York.
American Chain Co., Bridgeport, Conn.
American Locomotive Co., New York
American Malleable Castings Association, Cleveland, Ohio.
American Mason Safety Tread Co., Boston, Mass.
American Steam Gauge & Valve Mfg. Co., Boston, Mass.
American Steel Foundries, Chicago.
American Tool Works Co., Cincinnati, Ohio.
American Vapor Torch Co., Chicago.
Anchor Packing Co., Philadelphia, Pa.
Ashton Valve Co., Cambridge, Mass.
Assn. of Mfgrs. Chilled Car Wheels, Chicago.
Atkins, E. C., & Co., Indianapolis, Ind.
Atlantic Hand Brake Corp., Buffalo, N. Y.

Baker, R. & L., Co., Cleveland, Ohio.
Barco Mfg. Co., Chicago.
Barrett Company, New York.
Beaudry & Co., Inc., Boston, Mass.
Besly, Charles H., & Co., Chicago.
Bettendorf Company, Bettendorf, Iowa.
Billingsley, P. L., Co., Cincinnati, Ohio.
Bird-Archer Co., New York.
Blackall, Robert H., Pittsburgh, Pa.
Boss Nut Co., Chicago.
Bowser, S. F., & Co., Inc., Fort Wayne, Ind.
Bradford Draft Gear Co., New York.
Brewster, Morris B., Inc., Chicago.
Brown & Co., Inc., Pittsburgh, Pa.
Brubaker, W. L., & Bros. Co., Millersburg, Pa.
Buckeye Steel Castings Co., Columbus, Ohio.
Bucyrus Co., S. Milwaukee, Wis.
Buffalo Brake Beam Co., New York.
Burry Railway Supply Co., Chicago.

Cambria Steel Co., Philadelphia, Pa.
Camel Co., Chicago.
Carborundum Co., Niagara Falls, N. Y.
Carnegie Steel Co., Pittsburgh, Pa.
Champion Ry. Equipment Corp., New York.
Chase, L. C., & Co., Boston, Mass.
Chicago-Cleveland Car Roofing Co., Chicago.
Chicago Pneumatic Tool Co., New York.
Chicago Railway Equipment Co., Chicago.
Clark Car Co., Pittsburgh, Pa.
Clark Tructractor Co., Buchanan, Mich.
Cleveland Car Specialty Co., Cleveland, Ohio.
Cleveland Pneumatic Tool Co., Cleveland, Ohio.
Cleveland Steel Tool Co., Cleveland, Ohio.
Cleveland Twist Drill Co., Cleveland, Ohio.
Cochrane-Bly Co., Rochester, N. Y.
Commonwealth Steel Co., St. Louis, Mo.
Covington Machine Co., Inc., Covington, W. Va.
Craft Incorporated, New York.
Crosby Steam Gage & Valve Co., Boston, Mass.
Curtain Supply Co., Chicago.

Dale Machinery Co., Inc., New York.
Damascus Brake Beam Co., Cleveland, Ohio.
Davis Boring Tool Co., St. Louis, Mo.
Davis Brake Beam Co., Johnstown, Pa.
Dayton Pneumatic Tool Co., Dayton, Ohio.
Dearborn Chemical Co., Chicago
Detroit Lubricator Co., Detroit, Mich.
Detroit Twist Drill Co., Detroit, Mich.
Diamond Machine Co., Providence, R. I.

Dickson, Paul, Inc., Chicago.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Dressel Manufacturing Corp'n, New York.
Duff Manufacturing Co., Pittsburgh, Pa.

Eagle Manufacturing Co., Wellsburg, W. Va.
Edgewater Steel Co., Pittsburgh, Pa.
Edison Storage Battery Co., Orange, N. J.
Edna Brass Manufacturing Co., Cincinnati, Ohio.
Edson Manufacturing Corp'n, Boston, Mass.
Edwards, O. M., Co., Inc., Syracuse, N. Y.
Electric Arc Cutting & Welding Co., Newark, N. J.
Electric Controller & Mfg. Co., Cleveland, Ohio.
Electric Service Supplies Co., Philadelphia, Pa.
Electric Storage Battery Co., Philadelphia, Pa.
Elvin Mechanical Stoker Co., New York.
Elwell-Parker Electric Co., New York.
Emery, E., Pittsburgh, Pa.
Enterprise Railway Equipment Co., Chicago.
Everlasting Valve Co., Jersey City, N. J.
Ewald Iron Co., Louisville, Ky.

Fire Gun Manufacturing Co., Inc., New York.
Flannery Bolt Co., Pittsburgh, Pa.
Ford, J. B. Co., Wyandotte, Mich.
Forged Steel Yoke Corp'n, Rochester, N. Y.
Fort Pitt Malleable Iron Co., Pittsburgh, Pa.
Fort Pitt Spring & Mfg. Co., Pittsburgh, Pa.
Foster, Walter H., Co., New York.
Four Wheel Auto Drive Co., Clintonville, Wis.
Franklin Railway Supply Co., Inc., New York.
Frost Railway Supply Co., Detroit, Mich.
Futrell Coupler Co., Inc., Streator, Ill.

Galena-Signal Oil Co., New York.
Garlock Packing Co., Palmyra, N. Y.
Geist Manufacturing Co., Atlantic City, N. J.
General Electric Co., Schenectady, N. Y.
Giessel, Henry, Co., Chicago.
Gold Car Heating & Lighting Co., Brooklyn, N. Y.
Gould Coupler Co., New York.
Gray, G. A., Co., Cincinnati, Ohio.
Griffin Wheel Co., Chicago.
Grip Nut Co., Chicago.

Hagy, J. Milton, Waste Works, Philadelphia, Pa.
Hale & Kilburn Corporation, Philadelphia, Pa.
Hall Draft Gear Corporation, Hamilton, Ont.
Hammett, H. G., Troy, N. Y.
Hanna Locomotive Stoker Co., Cincinnati, Ohio.
Harrington, Edwin, Son & Co., Inc., Philadelphia, Pa.
Heald Machine Co., Worcester, Mass.
Hendey Machine Co., Torrington, Conn.
Heywood Wakefield Co., Wakefield, Mass.
Howell Electric Motors Co., Howell, Mich.
Hunt-Spiller Manufacturing Corp'n, S. Boston, Mass.
Hutchins Car Roofing Co., Detroit, Mich.
Hyatt Roller Bearing Co., New York.

Illinois Steel Co., Chicago.
Independent Pneumatic Tool Co., Chicago.
Individual Drinking Cup Co., Inc., Easton, Pa.
Ingersoll Milling Machine Co., Rockford, Ill.
Ingersoll-Rand Co., New York.
International Motor Co., New York.

Jacques, H. W., Philadelphia, Pa.
Jenkins Bros., New York.
Johns-Manville Inc., New York.
Joliet Railway Supply Co., Chicago.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Joyce-Cridland Co., Dayton, Ohio.

Keller, Wm. H., Inc., Grand Haven, Mich.
Kerite Insulated Wire & Cable, New York.
Key-Bolt Appliance Co., Orchard Park, N. Y.
Keyoke Railway Equipment Co., Chicago.
King Pneumatic Tool Co., Chicago.

Landis Machine Co., Waynesboro, Pa.
Lehmann Machine Co., St. Louis, Mo.
Lehon Company, Chicago.
Lewis-Shepard Co., Boston, Mass.
Libbey Glass Mfg. Co., Toledo, Ohio.
Liberty Manufacturing Co., Pittsburgh, Pa.
Locomotive Firebox Co., Chicago.
Locomotive Stoker Co., Pittsburgh, Pa.
Logan Iron & Steel Co., Burnham, Pa.
Long, Chas. R., Jr., Co., Louisville, Ky.
Lovell, F. H., & Co., Arlington, N. J.
Lowe Brothers Co., Dayton, Ohio.

MacRae's Blue Book, Chicago.
Machinery, New York.
Madison-Kipp Corp., Madison, Wis.
Manning, Maxwell & Moore, Inc., New York.
Massachusetts Mohair Plush Co., Boston, Mass.
Mercury Manufacturing Co., Chicago.
Merrill Co., Chicago.
Metal & Thermit Corp., New York.
Midgley & Borrowdale, Chicago.
Midvale Steel & Ordnance Co., Philadelphia, Pa.
Milburn, Alexander, Co., Baltimore, Md.
Milwaukee Tank Works, Milwaukee, Wis.
Miner, W. H., Chicago.
Minich Railway Appliance Corp., Philadelphia, Pa.
Morton Manufacturing Co., Chicago.
Morton Manufacturing Co., Muskegon Heights, Mich.
McCabe Manufacturing Co., Lawrence, Mass.
McConway & Torley Co., Pittsburgh, Pa.

Nathan Manufacturing Co., New York.
National Boiler Washing Co. of Ill., Chicago.
National Brake Company, Inc., Buffalo, N. Y.
National Car Wheel Co., Pittsburgh, Pa.
National Lock Washer Co., Newark, N. J.
National Malleable Castings Co., Cleveland, Ohio.
National Railway Appliance Co., New York.
National Railway Devices Co., Chicago.
National Tube Co., Pittsburgh, Pa.
Nazel Engineering & Mach. Wks., Philadelphia, Pa.
Neville Lubricator Co., Pittsburgh, Pa.
New York Air Brake Co., New York.
Nicine Co., Chicago.
Niles-Bement-Pond Co., New York.
Norton, A. O., Inc., Boston, Mass.
Norwalk Iron Works Co., So. Norwalk, Conn.
Nuttall, R. D., Co., Pittsburgh, Pa.

Okadee Company, Inc., Chicago.
Okonite Co., Passaic, N. J.
Oldham, George & Son, Co., Baltimore, Md.
Oliver Elec. & Mfg. Co., St. Louis, Mo.
O'Malley-Beare Valve Co., Chicago.
Oxweld Railroad Service Co., Chicago.

Page Steel & Wire Co., Bridgeport, Conn.
Paige & Jones Chemical Co., New York.
Pantasote Co., New York.
Parkesburg Iron Co., Parkesburg, Pa.
Paxton-Mitchell Co., Omaha, Neb.
Pels, Henry, & Co., Inc., New York.
Penn Iron & Steel Co., Creighton, Pa.
Pillied Company, Swanton, Ohio.
Pilot Packing Co., Inc., Chicago.
Pittsburgh Steel Foundry Co., Pittsburgh, Pa.
Pittsburgh Testing Laboratory, Pittsburgh, Pa.
Pocket List of Railroad Officials, New York.
Porter-Richards Machinery Co., Philadelphia, Pa.
Pratt & Lambert, Inc., Buffalo, N. Y.
Pressed Steel Car Co., New York
Princeton Foundry & Supply Co., Princeton, W. Va.
Production Machine Co., Greenfield, Mass.
Pyle-National Co., Chicago.

Racine Tool & Machine Co., Racine, Wis.
Railroad Herald, Atlanta, Ga.
Railway Devices Co., St. Louis, Mo.
Railway Materials Co., Chicago.
Railway Purchases & Stores, Chicago.
Railway Review, Chicago.
Railway Storage Battery Car Co., New York.
Ralston Steel Car Co., Columbus, Ohio.
Reading Iron Co., Reading, Pa.
Reed-Prentice Co., Worcester, Mass.
Republic Iron & Steel Co., Youngstown, Ohio.
Rivet Cutting Gun Co., Cincinnati, Ohio.
Roberts Automatic Connector Co., Ltd., Sarnia, Ontario.
Rogatchoff Co., Baltimore, Md.
Roebling's, John A., Sons, Co., Trenton, N. J.
Rome Iron Mills, Inc., New York.
Rubberset Co., Newark, N. J.
Ryerson, Joseph T., & Son, Chicago.

S K F Industries, Inc., New York.
Safety Car Htg. & Ltg. Co., New York.
Sargent Co., Chicago.
Schaefer Equipment Co., Pittsburgh, Pa.
Sellers, Wm., & Co., Inc., Philadelphia, Pa.
Sharon Pressed Steel Co., Sharon, Pa.
Sherritt & Stoer Co., Inc., Philadelphia, Pa.
Silumite Products Corp., Philadelphia, Pa.
Simmons-Boardman Publishing Co., New York.
Smith Adjustable Hub Plate Co., Chicago.
Southern Wheel Co., St. Louis, Mo.
Southwark Foundry & Machine Co., Philadelphia, Pa.
Stafford Roller Bearing Car Truck Corp., Lawton, Mich.
Standard Car Truck Co., Chicago.
Standard Coupler Co., New York.
Standard Forgings Co., Chicago.
Standard Railway Equipment Co., Chicago.
Stone Franklin Co., Inc., New York City.
Stucki, A., Co., Pittsburgh, Pa.
Sunbeam Electric Mfg. Co., Evansville, Ind.
Superheater Co., New York.
Superior Steel Castings Co., Chicago.
Swind Machinery Co., Philadelphia, Pa.
Symington, T. H., Co., Rochester, N. Y.

Talmage Mfg. Co., Cleveland, Ohio.
Tuco Products Corp., New York.

Underwood, H. B., Corp., Philadelphia, Pa.
Union Draft Gear Co., Chicago.
Union Metal Products Co., Chicago.
Union Spring & Mfg. Co., Pittsburgh, Pa.
U. S. Light & Heat Corp'n, Niagara Falls, N. Y.
United States Metallic Packing Co., Philadelphia, Pa.
United States Rubber Co., Chicago.
Universal Draft Gear Attachment Co, Chicago.
Universal Packing & Service Co., Chicago.

Vanadium-Alloys Steel Co., Latrobe, Pa.
Vapor Car Heating Co., Inc., Chicago.
Verona Tool Works, Pittsburgh, Pa.
Vissering, Harry, & Co., Inc., Chicago.

Walworth Manufacturing Co., Boston, Mass.
Waugh Draft Gear Co., Chicago.
Wayne Tool Manufacturing Co., Waynesboro, Pa.
West Disinfecting Co., New York
Western Railway Equipment Co., St. Louis, Mo.
Western Steel Car & Foundry Co., New York.
Westinghouse Air Brake Co., Wilmerding, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Wheel Truing Brake Shoe Co., Detroit, Mich.
White American Locomotive Sander Co., Inc., Roanoke, Va.
Whiting Corporation, Harvey, Ill.
Wilbert Manufacturing Co., Chicago.
Willard Storage Battery Co., Cleveland, Ohio.
Williams Tool Corporation, Erie, Pa.
Wilson-Imperial Company, Newark, N. J.
Wine Railway Appliance Co., Toledo, Ohio.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.

Woods, Edwin S., & Co., Chicago.
Worthington Pump & Machinery Corp., Philadelphia, Pa.
Wyoming Shovel Works, Wyoming, Pa.

Yale & Towne Mfg. Co., Stamford, Conn.

TRACK EXHIBITORS

Buckeye Steel Castings Co., Columbus, Ohio.
Clark Car Company, Pittsburgh, Pa.
Four Wheel Drive Auto Co., Clintonville, Wis.
Inter-State Safety Appliance Co., Inc., Norristown, Pa.
Stafford Roller Bearing Car Truck Corp., Lawton, Mich.

$200,000,000 of Government Payments to Railroads Postponed to 1923

Expenditures of the federal government on account of the railroads during the fiscal year ending June 30, 1923, are estimated at $200,000,000 in a revised statement of the Treasury's latest estimates of receipts and expenditures sent by Secretary Mellon to committees of Congress on April 14. The estimates as to the fiscal year 1923 are based on estimates which appear in the budget submitted in December, 1921, after taking into account changes which have become apparent since that time. The budget for 1923 as submitted to Congress did not include any item of expenditure on account of the railroads, but Mr. Mellon says that the indications now are that owing to delayed settlements of matters arising out of federal control and under the guaranty for the six months following federal control, there will be payments of about $100,000,000 under the Railroad Administration and about $100,000,000 under the Interstate Commerce Commission during the fiscal year 1923. The postponement of these payments to 1923 is reflected in a corresponding reduction of railroad expenditures for the fiscal year 1922, and partly on this account and partly on account of the proceeds of the sale of about $230,000,000 of equipment trust notes of carriers, the item of railroad expenditures in the statement shows an estimated credit of about $56,000,000 as compared with estimated expenditures of about $337,000,000 when the budget was submitted. The Secretary uses this figure of $230,000,000 of equipment trust notes as of March 31, although the latest statement of the director general indicates a sale of $249,000,000.

Railway Revenues and Expenses for February

The Interstate Commerce Commission summary of railway revenues and expenses of Class I roads for February and two months is as follows:

Item	February		Two months	
	1922	1921	1922	1921
Average number of miles operated...	235,696.53	235,326.75	235,709.82	235,327.29
Revenues:				
Freight	$294,472,607	$284,216,672	$571,384,767	$609,400,642
Passenger	73,585,326	88,462,552	*157,314,702	†193,720,099
Mail	6,986,554	7,913,642	14,364,928	16,136,847
Express	6,300,683	4,457,672	12,820,694	11,899,871
All other transportation	12,052,003	11,732,196	24,081,912	25,168,601
Incidental	7,426,180	9,314,845	15,819,132	19,915,069
Joint facility—Cr.	780,994	608,437	1,388,716	1,312,647
Joint facility—Dr.	177,675	210,437	350,962	395,506
Railway operating revenues	401,426,672	406,495,579	796,823,889	877,158,270
Expenses:				
Maintenance of way and structures	46,535,345	53,316,603	95,249,268	114,168,877
Maintenance of equipment	91,956,913	108,220,839	185,542,265	232,248,977
Traffic	6,790,020	7,040,577	13,964,980	14,390,621
Transportation...	163,478,539	198,538,166	334,802,190	429,289,592
Miscellaneous operations	3,513,058	4,029,304	7,202,337	8,551,301
General	12,656,797	14,077,993	26,189,782	29,358,814
Transportation for investment—Cr.	429,538	377,600	845,754	955,441
Railway operating expenses.	324,501,134	384,645,882	662,105,068	827,052,741
Net revenue from railway operations	76,925,538	21,849,697	134,718,821	50,105,529
Railway tax accruals	22,627,661	21,279,262	45,198,590	43,432,257
Uncollectible railway revenues	97,659	77,935	186,568	147,390
Railway operating income..	54,200,218	492,500	89,333,663	6,525,882
Equipment rents—Dr. balance.....	5,052,897	3,601,044	9,156,127	6,768,471
Joint facility rent—Dr. balance.....	1,376,424	2,056,427	2,872,825	3,383,754
Net railway operating income.	47,770,897	*D5,164,971*	77,304,711	*D3,626,343*
Ratio of expenses to revenues (per cent)	80.84	94.62	83.09	94.29

*Includes $4,371,793, sleeping and parlor car surcharge.
†Includes $4,761,527, sleeping and parlor car surcharge.
D Decrease.

Traffic News

A meeting to organize a National Association of Traffic Clubs will be held in the rooms of the Traffic Club of Chicago at the Hotel LaSalle in that city on May 15, 16 and 17. Present indications are that more than 60 national committeemen, representing 30 traffic clubs, will be present at this meeting.

In a recent hearing before the Railroad Commission of California on an application of the Marin Transportation Company for authority to operate automobile freight service between San Francisco and points in Marin county the commission held that the present carriers are able to provide full service and as a result rejected the application.

Paul Henderson, of Chicago, has been nominated by President Harding for appointment as second assistant postmaster general in charge of railway mail service, to succeed Col. E. H. Shaughnessy, deceased. Mr. Henderson is a son-in-law of Congressman Madden of Illinois and has been connected with the Brownell Improvement Company of Chicago.

The Chicago, Milwaukee & St. Paul has announced a reduction in its dining car prices. Club breakfasts will be served at prices ranging from 25 cents to $1, and club luncheons and club dinners at 60 cents to $1.25. There will be no change, however, in the price of the table d'hote dinner served on the Pioneer Limited between Chicago and the Twin Cities, and the Southwest Limited, between Chicago and Kansas City.

Reductions in freight rates between the United States and Mexico have been proposed through a tentative agreement of five American railroads serving the Mexican border territory and the National Railways of Mexico. Reductions will range from 25 to 50 per cent. Summer tourists' rates have already been put into effect in Mexico, and it is expected that the American roads will follow with like reductions to border points. The present round trip fare from border points to Mexico City is $51.75, representing a reduction of about $19.

The Federal District Court at Kansas City, Mo., on April 13, upon the application of the railroads, issued a broad injunction against ticket scalping. The restraining order heretofore issued by this court is continued in force, as a temporary injunction, and the defendants are restrained from engaging in the business of purchasing or selling railroad tickets of any kind, nature or character, and from doing any business as railroad ticket brokers or railroad ticket scalpers; and from advertising for or soliciting for the sale or purchase of railroad tickets of any kind, nature or character. The scalpers have removed all cut rate signs and it is believed that the railroads will be free from scalping in Kansas City. This application for injunction was evidently made in view of the reduced rate excursion tickets that are soon to go on sale.

Fifteen carloads of silk arrived in New York over the New York Central last week in less than five days from Vancouver, B. C., and in two weeks from Yokohama. The Canadian Pacific reports the run as follows:

"The consignment, 3,697 bales of raw silk (17 cars), was delivered at Vancouver from the "Empress of Asia" on April 10, nine days after leaving Yokohama. Fifteen of the 17 cars were destined to New York and reached there in 4 days, 16 hrs., 10 min. after the ship tied up in Vancouver harbor. Actual running time Yokohama to Victoria, 8 days, 19 hrs., 32 min.; Victoria to Vancouver, 6 hrs., 20 min.; transfer to cars at Vancouver, 5 hrs., 58 min.; Vancouver to Prescott, Ont., 3 days, 17 hrs., 57 min.; time at Prescott 1 hr., 30 min.; Prescott to Ogdensburg, N. Y., 3 hrs., 10 min; Ogdensburg to New York, 11 hrs., 35 min.; Yokohama to New York, 13 days, 18 hrs., 2 min.

The Chicago & Alton announces homeseekers' fares from all points on its line to destinations in Alberta, Colorado, Idaho, Manitoba, Minnesota, Montana, New Mexico, North Dakota, South Dakota, Oregon, Saskatchewan, Utah and Washington. The tickets will be sold on the first and third Tuesdays of each month at a one way rate plus two dollars for the round trip,

the tickets good for 21 days from date of sale. This company will also place on sale daily between May 15 and September 30, reduced summer excursion fares from all points on its line. To destinations in the west these tickets will be sold at one and one-tenth fare for the round trip; to Michigan, Minnesota and Wisconsin, the rate will be one and one-half for the round trip; and to eastern and northeastern points, one and three-fifths rate for the round trip sales to Colorado, Wyoming and the national parks will not commence until June 1. There will also be 20 to 30-day excursion rates to points in Wisconsin, Michigan and Minnesota.

The United States Shipping Board is planning to begin hearings shortly in various parts of the country on Section 28 of the merchant marine act, which is intended to confine export and import rail rates to the traffic moved in American ships whenever the Shipping Board certifies to the Interstate Commerce Commission that adequate shipping facilities under the American flag exist to permit enforcement of the section. The announced intention of the Shipping Board to enforce this section had aroused numerous protests from chambers of commerce and other commercial organizations interested in export and import traffic and the board appointed a committee consisting of Commissioners Thompson, Benson and Chamberlin to conduct the hearings. The first will be held at Boston and a schedule of dates and places will be announced shortly. The board desires it made plain that the only question on which it desires evidence is as to whether there are adequate shipping facilities under the American flag.

Rate Decision Still Uncertain

Thus far no indications have appeared as to when the Interstate Commerce Commission will hand down its decision in the rate case, on which it held hearings for three months, although it is understood that the commissioners are working overtime in trying to reach a decision. Some time ago Commissioner Esch told the House committee on interstate and foreign commerce that the commission hoped to have the decision by the first week in April. It is understood that the 11 members of the commission are of many different minds as to whether and to what extent rates should be reduced. One rumor, which is probably only a guess based on the attitudes indicated by various members of the commission at different times, is that four members of the commission felt that under the law rates could not be reduced, while four were of the opinion that a small general percentage reduction should be made, while three were inclined to favor reductions on basic commodities.

Ticket Frauds Prohibited by New Law in New York

The Legislature of New York has passed a new law penalizing the misuse of railroad tickets, and the Long Island Railroad has issued a notice of it for the benefit of season ticket holders. The gist of the law is to the effect that

> No person shall obtain transportation for himself, herself, or others, or shall avail himself, herself or others of any means of transportation at rates other than or different from those prescribed in the schedules of rates filed and published, or in violation of the conditions attached to any reduced rate ticket, provided such conditions are contained in the filed and published schedules.

This, says the circular, means that the misuse of commutation tickets, and family-trip tickets, is a misdemeanor, punishable by imprisonment for not more than one year, or by a fine of not more than $500, or by both. Commenting on the law, P. H. Woodward, general passenger agent of the Long Island, said that his road would expect the new law to be obeyed by persons who have been "innocently" lending their tickets on days not used by themselves. The regular scalpers, however, he intends to bring to justice. Persons who are not scalpers and not innocent seem not to be covered by Mr. Woodward's comment.

"Practical Permanent Pastures"

Saving *two hundred years* of the time that Nature would require to convert waste and uncared for lands in Georgia and Alabama into first-class feeding ground for cattle, is the keynote of a pamphlet with the above title, which has been issued by the Agricultural Department of the Central of Georgia Railway describing the results of its activities during the past year, looking to the encouragement of farmers to introduce the best qualities of grass and thus promote the profitable raising of livestock. This railroad company's hundred-dollar prizes, offered in 46 counties for the best pastures, were noticed in the *Railway Age* of June 10, 1921, page 1371.

During the past two months, the farmers in the territory adjacent to the railway have bought and sown 11 tons of seed, and much more could have been sold to them if it could have been obtained. The railroad company also has aided the farmers in the securing of several hundred head of registered cattle and has given 137 boars and 202 bulls as prizes in Boys' Club contests.

Every one of the 46 test pastures proved a success, and the pamphlet contains interesting letters from the farmers who made the improvements.

Joint Commission Report to Recommend Constructive Treatment of Transportation

The forthcoming report to Congress of the Joint Commission of Agricultural Inquiry will disclose a mass of valuable facts and figures bearing on the relation of transportation to agriculture and industry.

Chairman Sydney Anderson of Minnesota, speaking for the commission, says: "We are convinced that the inquiry concerning transportation has gone further than any such investigation heretofore made. The collecting and assembling of the data has required the combined efforts of more than 1,600 persons and the circulation of more than 250,000 questionnaires. Over 100 committees representing agriculture and industry were established, and those in turn appointed 200 sub-committees.

"Further, the joint commission has had the active and effective co-operation of the various governmental commissions, departments and bureaus and of farm and railway organizations, etc.

"The report will include a score or more of distinct recommendations to Congress, bearing chiefly on governmental contracts with transportation systems and an equal number of conclusions addressed to transportation management and to producers and shippers. The commission is convinced that transportation requires constructive and helpful governmental and public treatment rather than repressive or restrictive regulation. . . . ."

Coal Production

Complete returns of coal loaded into cars at the mines, compiled by the Geological Survey, indicate that production during the first week of the strike was 3,784,000 net tons of bituminous coal, and a few cars of anthracite dredged from the rivers. The total production of all coal was 3,793,000 net tons.

Preliminary telegraphic returns for the week of April 10-15 indicate no change in anthracite, but a slight decrease in bituminous. It will be seen from the following table of cars of soft coal loaded daily that the output on Monday, Tuesday, and Wednesday was running consistently below that on the corresponding days of the week before. On Thursday, April 13, however, loadings increased to 11,480 cars, as high a figure as any recorded since the strike began.

First Week		Second Week	
Monday, April 3	11,445	Monday, April 10	10,782
Tuesday, April 4	11,019	Tuesday, April 11	10,678
Wednesday, April 5	11,437	Wednesday, April 12	10,979
Thursday, April 6	11,090	Thursday, April 13	11,480
Friday, April 7	11,307		
Saturday, April 8	8,938		

The current production is less than the districts now at work are able to produce when the demand for coal is active, the report says. It is true that a number of important non-union mines in the Connellsville coke region and in Central Pennsylvania have been closed by the strike, but the existing demand is not sufficient to call out full production in those districts remaining at work. From mines in many non-union fields reports of "no market," "dull demand," and "unbilled coal," continue to be received. The number of loaded cars unconsigned at the mines was very large when the strike began, and it is increasing rather than decreasing.

Production of anthracite ceased virtually during the first week of the strike, 172 cars being shipped during the week ended April 8. Based on these loadings, the total output is estimated at 9,000 net tons.

Final reports of shipments of anthracite during March indicate a total production of 8,757,000 net tons. In comparison with February this was an increase of 27 per cent. The month's production exceeded that of any similar month during the past nine years, except in 1917 and 1918.

The government is still maintaining its policy of no interference.

Commission and Court News

Interstate Commerce Commission

The commission has suspended until August 16 the operation of schedules published by the Erie which propose increases and reductions on brick from Corry, Pa., to New York rate points.

The commission has adopted a conference ruling that Section 208a of the Transportation Act, 1920, does not authorize the commission to award reparation, or consent to an award of reparation made by a state commission, on intrastate shipments which moved during the guaranty period.

The commission has suspended until August 13 the operation of certain schedules published by the Bessemer & Lake Erie which propose the cancellation of joint through rates on bituminous and cannel coal from B. & L. E. Group No. 1 points in Pennsylvania, to various destinations on the Buffalo, Rochester & Pittsburgh.

The commission has suspended until August 15 the operation of certain rates which propose to increase from 38.5 cents to 45.5 cents per 100 lb. existing rates on lumber from points in Mississippi on the Alabama & Mississippi, Jackson & Eastern, Mississippi & Western and Meridian & Memphis to destinations on the Chesapeake & Ohio, Ashland, Ky. to East Huntington, W. Va., inclusive.

Southeastern Sugar Investigation

The commission has ordered an investigation into the reasonableness of the rates on sugar from New Orleans and other producing points in Louisiana, and from Savannah, Ga., Boston, Mass., New York, N. Y., Philadelphia, Pa., Baltimore, Md., and other producing and distributing points on the Atlantic seaboard to points in Kentucky, Tennessee, Mississippi, Alabama, Georgia, Florida, North Carolina, South Carolina, and Louisiana east of the Mississippi river, including the east bank thereof, and the north bank of the Ohio river.

Court News

Telegraph Office Held Not Continuously Operated

A railroad, the International & Great Northern, kept a telegraph office open from 7 a. m. to 7 p. m. only, with one operator, who remained on duty from 7 a. m. to 6. p. m. and, when necessary, till 7 p. m. The company had an arrangement with another railroad, which had a telegraph office in a tower at some distance, continuously operated by three shifts, to receive and deliver its train orders when its own office was closed, for which service it paid. The Circuit Court of Appeals, Fifth Circuit, holds this did not make the office one continuously operated within section 2 of the Hours of Service Act. Judgment for the government was reversed (261 Fed. 703).—Baker v. United States, 276 Fed. 897.

Negligence in Kicking Coupler

The Georgia Court of Appeals holds that a car coupler who sees and knows that the drawhead and knuckle of the coupling are defective and will not act automatically, and who, while an engine with cars attached is backing rapidly to the point where the coupling is to be made, kicks against the drawhead and knuckle, to adjust them, just at the moment of impact, and thus gets his foot mashed, cannot hold the railroad liable, although a signal given by him was disregarded by the engineman in thus rapidly backing the engine and cars; it not appearing that the injured employee did not see and know the speed at which the engine and cars were moving. The rule of comparative damages under the Georgia Employers' Liability Act does not apply where the fault of the employee amounts to a lack of ordinary care, making him the author of his own injury.—Green v. Flint River Northeastern (Ga.) 110 S. E., 243.

Labor Board Decisions

Foremen Need Not All Be Paid the Same Rate

During the government control period the Portland division of the Southern Pacific was under a different regional director from the rest of the Southern Pacific System, and this regional director did not advance the wages of bridge and building and water service foremen and assistant foremen on the same basis that advances were made on the rest of the Southern Pacific System. Wage advances under Decision No. 2, being applied to the rates of pay in effect on March 1, 1920, perpetuated these differences. In answer to a complaint of the employees, requesting that this differential be removed, the railroad said that the provisions of Decision No. 2 had been applied legally; and this contention was sustained by the Labor Board. The board stated, however, that its decision does not prevent negotiations between the railroad and the employees with regard to the salaries paid these foremen.—*Decision No. 798.*

Seniority Retained While Filling Temporary Position

In February, 1920, a car repairman at the East Fitchburg shops of the Boston & Maine, with 19 years' seniority, applied for and was assigned to a temporary position as car inspector at the passenger station at Fitchburg. Later this job was advertised as a permanent vacancy and this man refused to bid on the permanent position, returning to the shops; and there he was informed that he had lost his seniority. The employees, through the American Federation of Railroad Workers, contended that in accepting the temporary assignment he did not lose his seniority at the shops. The Labor Board decides that in view of the fact that the position accepted by him was advertised as temporary, he should be restored to his seniority standing at the shops; and be compensated for any loss of wages which he later suffered by loss of seniority through a layoff on account of a reduction of forces at the shops.—*Decision No. 773.*

Brakeman May Act as Fireman in Emergency

L. C. Roth, a fireman on the Missouri, Kansas & Texas, became ill and was relieved in the middle of a trip at Cushing, Oklahoma, on August 13, 1920. H. G. Olmstead, a fireman regularly assigned to a switch engine at Cushing, who had been off duty about 12 hours at the time, claimed that he should have been called, instead of a brakeman, to relieve Roth for the remainder of the trip. The carrier contended that while Olmstead was assigned to the switch engine at Cushing he was not entitled to work outside of his regular assignment and, further, that there was no assurance that Roth's illness would improve sufficiently to justify putting him in Olmstead's place on the switch engine. The Labor Board decides that the claim of the train service brotherhoods that Olmstead is entitled to a minimum day's pay for not being called, is not supported by any rule of the agreement between the employees and the carrier; and the claim is denied.—*Decision No. 773.*

Board Sustains Managerial Function of Roads

The position of ticket agent on the Missouri, Kansas & Texas, at Sedalia, Mo., paying 71¾c. per hr., was reclassified on February 28, 1921, as ticket clerk, paying a rate of 50c. per hr. The Order of Railroad Telegraphers protested against this action, stating that prior to the change separate freight and ticket offices were maintained. No change was made in the duties or responsibilities of the position, the only difference being that reports were now made in the name of the agent instead of the ticket clerk. The road maintained that business conditions at Sedalia justified the reclassification of the position and the extension of the authority of the freight agent over the passenger station. The road contended further that the determination of the character of the service to be rendered in its relation to the public at its stations is purely a managerial function and that there is no rule in the agreement between the road and its employees to support the employees' contention that it shall confer with them prior to making changes of this character. The labor board denied the claim of the employees.—*Decision No. 837.*

Foreign Railway News

The First Locomotive Works in Poland

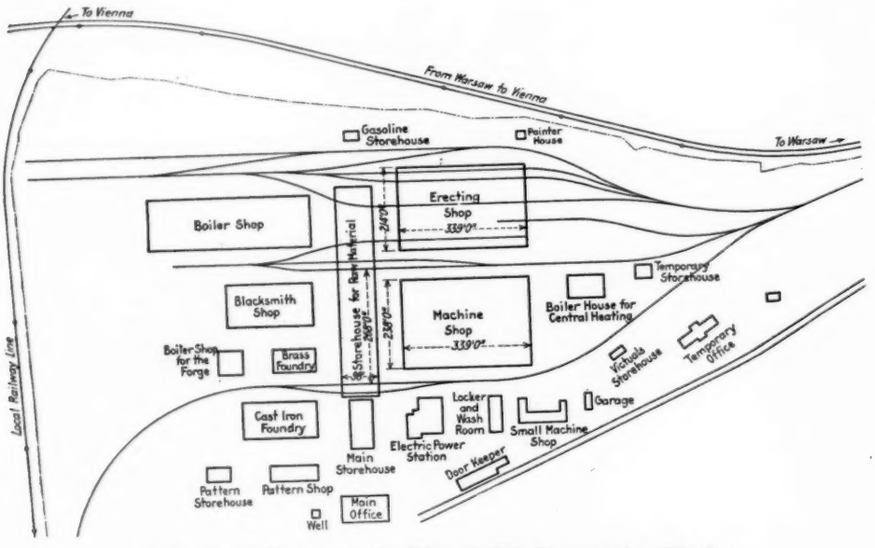
J. Dabrowski, Chrzanow, Poland.

One of the most important problems of the Independent Polish Government and of private industry has been to restore the railways and to increase the number of locomotives. This question became the more vital as the geographical situation of Poland makes it a natural mediator between west and east. For normal transport conditions there are necessary now about 3,000 additional new locomotives, the average number of locomotives needed for 1 klm. of railway track being in Europe about 0.4.

General View of the First Polish Locomotive Works

The First Polish Locomotive Works Ltd., Chrzanow, Poland, are really the first step in the development of this industry in Poland and they have received a government order for 1,200 new locomotives. The works in question are advantageously situated near the coal mines and industrial districts of Upper Silesia.

In proportions and arrangement the buildings are unlike the other plants completed during recent years in that country and they embody a number of features that warrant detailed consideration. The main buildings of reinforced concrete are spacious and secure an abundance of natural light by large windows and glass areas in the roof. The erecting shop has ground dimensions of 339 ft. 6 in. by 217 ft. 4 in. and consists of four parallel bays. The bay heights were determined very largely by the crane requirements. The main bay is equipped with a crane runway for two 50-ton cranes with top of rail 36 ft. 1 in. and two 10-ton cranes with top of rail 22 ft. 2 in. above the floor. The machine shop has ground dimensions of 339 ft. 6 in. by 238 ft. 2 in., is divided into seven parallel bays and provided with six cranes ranging from 5 to 15 tons. The position of the other buildings relative to the whole plant is shown in the general plan.



Plan of the Shops of the First Polish Locomotive Works

As to the internal equipment of the shops it was policy of the management to apply all technical improvements in both machine tools and working methods. Special machine tools, high speed steel, electric drive, interchangeability of parts, modern systems of shop management were taken into most careful consideration.

All electric current used in the shops is purchased from the neighboring electric power company being received as 22,000 volt 50 cycle, three phase alternating current, which is reduced by transformers to 380 volt three phase 50 cycle current. Rotary converters are also provided to supply 220 volt direct current which is used to operate the variable speed motors of machine tools. All cranes, except those of the cast iron foundry, are operated by alternating current.

The management of the works pays much attention to American industry and American methods of working and has active intercourse with many firms of this country. The present financial difficulties due to the low rate of exchange of Polish money do not permit the realization of many intentions. The first locomotives should be assembled this year.

The First Polish Locomotive Works is a private company with financial support of the Polish banks.

Proposed New Line from Llano Grande to Mazatlan

According to a report received from Durango, the financing of the construction of an extension of the line of National Railways of Mexico which now runs from Durango to Llano Grande, 75 miles, to the port of Mazatlan on the Pacific Coast, is proposed by a syndicate of California men who are said to own large bodies of land along the route of the proposed line. It is estimated by engineers that the cost of building the railroad from Llano Grande to Mazatlan would be about $20,000,000. For much of the way the rough Sierra Madre range must be crossed at altitudes ranging from 7,000 to 8,000 feet. To get down to sea level on the Pacific side of the mountains the drop must be made within a distance of 50 miles, it is stated. It was announced several months ago that the Mexican government had decided to build this extension and recently work was started on the grade out of Llano Grande, which is in the heart of one of the best timbered regions of Mexico.

The line from Durango to Llano Grande was built just before the revolutionary period for the purpose of affording a transportation outlet for a large body of commercial timber which at that time was being exploited. In connection with this railroad project the Mexican government plans to make extensive harbor and port improvements at Mazatlan at a cost of several million dollars. The construction of a railroad over the Sierra Madres to Mazatlan has been under consideration for many years. At the time the late Collis P. Huntington built the Mexican International Railroad from Eagle Pass, Texas, to Durango, it was his purpose to make Mazatlan the Pacific terminus of the line. He had engineers in the field for several years trying to find a feasible route over the mountains, but none was located. When the Mexican International passed out of the hands of the Southern Pacific interests the project of extending the line was dropped.

Begin Electrification in Chile

Work on the electrification of the Chilean State Railways between Valparaiso and Santiago was begun on April 12, according to press dispatches from Chile. The Westinghouse Electric & Manufacturing Company has this contract.

Equipment and Supplies

Locomotives

THE ATLANTIC COAST LINE is inquiring for 20 Pacific type locomotives.

THE PACIFIC STATE LUMBER COMPANY, Tacoma, Wash., has ordered 1 Prairie type locomotive from the Baldwin Locomotive Works.

THE BOSTON & MAINE, reported in the *Railway Age* of April 15, as inquiring for 2 Mallet type locomotives and 20 switching locomotives, has ordered this equipment from the American Locomotive Company.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered 15, 0-8-0 type locomotives from the American Locomotive Company. These locomotives will have 25 by 28 in. cylinders and total weight in working order of 216,000 lb.

THE CAMP MANUFACTURING COMPANY, Franklin, Va., has ordered one Prairie type locomotive from the American Locomotive Company. This locomotive will have 13 by 20 in. cylinders and a total weight in working order of 67,000 lbs.

THE CHICAGO & NORTH WESTERN is inquiring for 50 locomotives for which it will receive separate bids until noon, April 28. These include 20 Mikado type superheater freight locomotives, 20 six-wheel superheater switching locomotives and 10 Pacific type superheater passenger locomotives.

NORTON GRIFFITH & Co., Brazil, have ordered 5, 0-4-0 type locomotives and 3, 2-8-2 type from the American Locomotive Company. The switching locomotives will have 9 by 14 in. cylinders and a total weight in working order of 29,000 lb., the 2-8-2 type locomotives will have 15 by 20 in. cylinders and a total weight in working order of 84,000 lb.

Freight Cars

THE TOLEDO & WESTERN is inquiring for 10 to 20 box cars.

THE CENTRAL OF GEORGIA is inquiring for 50 to 200, 40-ton flat cars.

THE EL PASO AND SOUTHWESTERN is inquiring for 30 refrigerator cars.

THE ST. LOUIS SOUTHWESTERN is inquiring for from 200 to 1,000 box cars.

THE CINCINNATI, INDIANAPOLIS & WESTERN is inquiring for 300 freight cars.

THE CHICAGO GREAT WESTERN is inquiring for repairs to 100 refrigerator cars.

THE MISSOURI, KANSAS & TEXAS is inquiring for 300 flat cars of 40 tons' capacity.

THE NEW YORK, CHICAGO & ST. LOUIS contemplates asking for bids on 400 refrigerator cars.

THE ATLANTIC COAST LINE is in the market for 750 single sheathed box cars, of 40 tons' capacity.

THE TEXAS & PACIFIC will start immediately to repair a large number of freight cars in its shops at Marshall, Tex.

THE TOLEDO, ST. LOUIS & WESTERN is inquiring for 100 steel underframes, 50-ton flat car bodies and repairs to 300, 40-ton box cars.

THE SOUTHERN RAILWAY is asking for bids on 2,000, 36 ft. plain box cars, also on 500, 36 ft. automobile box cars. All these cars are to have steel center sills and steel ends and are to be of 40 tons capacity.

THE CHESAPEAKE & OHIO has given a contract to the Newport News Shipbuilding & Dry Dock Company for repairing 100 freight cars.

THE CHESAPEAKE & OHIO will receive bids until May 4 at Richmond, Va., for 1,500 hopper bottom gondola cars and for 1,500 flat bottom gondola cars, all to be of 57.5 tons capacity.

THE WABASH is inquiring for 250 all-steel coal car bodies of 55 tons' capacity. This is in addition to the inquiry for 250 car bodies of 50 tons' capacity, reported in the *Railway Age* of April 15.

Passenger Cars

THE SOUTHERN RAILWAY is inquiring for bids until April 25, at Washington, D. C., for passenger train cars as follows:

Twenty 69-ft. steel passenger coaches.
Fifteen 60-ft. steel combination baggage and express cars.
Ten 70-ft. steel combination passenger and baggage cars.
Fifteen 60-ft. steel postal cars.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 5 steel coaches and 2 steel baggage cars.

THE ANN ARBOR is inquiring for 2 coaches, 2 combination passenger and mail cars and 2 baggage cars.

THE CHICAGO, NORTH SHORE & MILWAUKEE will receive bids until May 22 for 10 passenger motor cars.

THE ATLANTIC COAST LINE, in the near future, contemplates inquiring for a number of passenger train cars.

THE FEDERAL RAILWAYS OF BRAZIL are inquiring through the car builders for 6 combination baggage and mail cars.

THE LOUISVILLE, HENDERSON & ST. LOUIS has ordered 5 passenger coaches from the American Car & Foundry Company.

THE ST. LOUIS-SAN FRANCISCO is inquiring for 6 chair cars. An unconfirmed report says that this road is also inquiring for 8 coaches.

THE BALTIMORE & OHIO has ordered a gasoline railway motor car and trailer from the Edwards Railway Motor Car Company, Sanford, N. C.

THE CHICAGO, BURLINGTON & QUINCY has ordered a gasoline railway motor car from the Edwards Railway Motor Car Company, Sanford, N. C.

THE FLORIDA EAST COAST, reported in the *Railway Age* of March 18, as inquiring for 10 baggage cars has ordered this equipment from the Pullman Company.

THE MISSOURI, KANSAS & TEXAS, noted in the *Railway Age* of March 25 as having renewed its inquiry for 30 passenger cars, has postponed action on this inquiry after May 1st.

THE WABASH, reported in the *Railway Age* of April 1 as inquiring for 8 coaches, 9 chair cars, 2 buffet chair cars, 2 cafe chair cars and 4 dining cars, has ordered this equipment from the American Car & Foundry Company. All these cars are to be of steel construction.

THE LOUISVILLE & NASHVILLE, reported in the *Railway Age* of March 18 as inquiring for 5 baggage cars, 5 combination baggage and horse cars, 6 coaches, 4 combination passenger and smoking cars and 5 combination passenger and baggage cars, has ordered this equipment from the American Car & Foundry Company.

Iron and Steel

THE WABASH is inquiring for 300, 36-in. wheels for passenger coaches.

THE CHICAGO GREAT WESTERN is inquiring for steel rails with joints and fastenings.

THE TENNESSEE CENTRAL is inquiring for 7,000 tons of 80-lb. steel rail with joints and fastenings.

THE CHICAGO, BURLINGTON & QUINCY has ordered 15,000 tons of rail from the Illinois Steel Company.

THE SOUTHERN RAILWAY has ordered 300 tons of bridge steel from the Virginia Bridge & Iron Company for use on a bridge over the Holston river.

THE PHILADELPHIA & READING has ordered 500 tons of bridge steel from the American Bridge Company. This is for the bridge at Norristown, Pa., over the Schuylkill river.

THE CHICAGO, BURLINGTON & QUINCY has ordered from the American Bridge Company 2,496 tons of steel for bridge work and 2,136 tons of steel from the Fort Pitt Bridge & Iron Works for shop buildings at Denver, Colo.

THE SIAM STATE RAILWAYS are asking for bids until 2 p. m., July 31, 1922, at Bangkok, Siam, for a supply of rails and permanent way accessories. Specifications and drawings may be obtained from C. P. Sandberg, 143 Liberty street, New York City.

Track Specialties

THE ERIE is reported to have let a large tie plate order.

THE MISSOURI PACIFIC is reported to have ordered 1,500 kegs of spikes and bolts.

THE SOUTHERN PACIFIC is reported as inquiring for 20,000 kegs of spikes and bolts.

THE NEW YORK, CHICAGO & ST. LOUIS is about to place orders for 30,000 rail joints.

THE MISSOURI PACIFIC is inquiring for 164,000 angle bars and 2,000 kegs of track spikes.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS will receive bids until noon April 28, for 198,000 tie plates, 30,000 pairs of 90-lb. angle bars, 7,000 kegs of track spikes and 4,500 kegs of track bolts.

Machinery and Tools

THE SOUTHERN PACIFIC has ordered one wheel press from the Niles-Bement-Pond Company.

THE NEW YORK CENTRAL has ordered one planer and one boring mill from the Niles-Bement-Pond Company.

THE EDWARDS RAILWAY MOTOR CAR COMPANY, Sanford, N. C., is in the market for one 18 in. and one 26 in. engine lathe and one 18 in. and one 24 in. shaper.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for a 16-in. by 6-ft. heavy duty tool room lathe with relieving and draw-in attachments; a 16-in. by 6-ft., or 18-in. by 8-ft. engine lathe with taper attachment; a 20-in. by 12-ft., or 30-in. by 12-ft. engine lathe with taper attachment; a No. 60 or 61 Heald cylindrical grinder; a car wheel boring machine; a 6-ft. plain radial drill; an upsetting machine; a motor driven shear; a swaging machine; a No. 4 Cincinnati horizontal universal milling machine; a 40-in. Bullard vertical turret lathe; a Ryerson or equivalent flue-testing machine; a 24-in. by 10-ft. motor-driven quick change gear tool room lathe; a Ryerson or equivalent pneumatic flue welding machine; a Ryerson or equivalent single pneumatic flue welding machine for superheater flues; A Morton, 36-in. draw cut shaper with one rotating head or slotting driving boxes; a hot saw and tube expanding machine; a flue cutter for cutting safe ends; an automatic safe end cutting off machine; a superheater hot saw and tube expander; a sand blasting equipment; a No. 156 Fay & Egan cabinet planer or equivalent; a No. 77 American or equivalent planer and matcher; and a 5-in. by 14-in. outside molding machine.

SHORT LINE RAILROADS in Alabama (ten of them) operating altogether 600 miles of line, sustained a net loss in 1921 of $364,792, or $608 per mile. This statement was made by J. A. Streyer, of Atlanta, who appeared before the Alabama Public Service Commission last week to propose advances in freight rates. He said that five other roads would offer similar proposals.

Supply Trade News

G. Fred Collins is now associated with the sales department at Chicago of the **Gould Coupler Company**, New York.

The Pennsylvania Pump & Compressor Company has opened a Chicago office at 105 West Monroe street, under the management of **H. M. Montgomery.**

A. S. Merrill, formerly sales manager of the Chicago Fuse Manufacturing Company, has been appointed general sales manager of the **Appleton Electric Company,** Chicago.

The American Automatic Connector Company, Chicago, has installed its connectors on cars of the Sells-Floto Circus, the Hagenbeck-Wallace Circus and the Gollmar Brothers Circus.

George W. Schalchlin, sales engineer for the **Allen-Bradley Company,** Milwaukee, Wis., has recently been appointed manager of that company's new district office in St. Louis, Mo.

G. W. Schalchlin

Mr. Schalchlin was born at Little Rock, Ark., in 1893. He was graduated from the electrical engineering department of the University of Arkansas in 1913 and served two years' apprenticeship at electrical testing in the factory of the General Electric Company, Schenectady, N. Y. In 1916 he was made manager of the Magnolia, Ark., plant of the Arkansas Light & Power Company, which position he later resigned to work for a year in electrical construction work on the Panama Canal. During the war he served in France as a first lieutenant battalion adjutant of the 142nd Field Artillery. Upon his return from overseas he entered the service of the Allen-Bradley Company as controller engineer, which position he held until June, 1921, when he was placed on the sales force of that company.

C. J. Hamilton, Jr., assistant sales manager of the **Chicago Fuse Manufacturing Company,** Chicago, has been appointed manager of sales of that company, succeeding A. S. Merrill, resigned.

William E. Trubee, district representative of the **Franklin Manufacturing Company,** Franklin, Pa., has removed his office from 501 Fifth avenue, to room 1043 Grand Central Terminal, New York City.

The Power Plant Equipment Company, Kansas City, Mo., now represents the **Combustion Engineering Corporation,** New York City, in eastern Kansas, eastern Nebraska, western Arkansas and western Missouri.

W. W. Halsey, manager of the New York City office of the **U. S. Light & Heat Corporation,** Niagara Falls, N. Y., will, on May 1, remove his office from 30 East Forty-second street to room 5617, Grand Central Terminal.

Theodore L. Dodd, 80 E. Jackson street, Chicago, has been appointed western sales representative of the **D. J. Crowley Company,** Detroit, Mich. He will also supervise the sales of the **Penn Seaboard Corporation,** Philadelphia, and the **Titusville Forge Company,** Titusville, Pa.

T. W. Barnes, for many years factory representative of the Baker R. & L. Company in the Chicago district, and **W. F. Hebard,** national distributor of Buda industrial trucks, with

headquarters at Chicago, have formed an organization under the name of **W. F. Hebard & Co.** to handle a complete line of Baker industrial tractors, trucks, cranes and specialties in the Chicago territory.

J. B. White, president and general manager of the **Exchange Sawmills Sales Company,** has been appointed chairman of the board of directors with headquarters at Kansas City, Mo. **R. B. White,** assistant general manager, succeeds J. B. White as president and general manager and **F. R. Watkins,** central sales manager, has been appointed secretary, succeeding A. T. Hemingway.

Esherick & Hoyle, Otis building, Philadelphia, Pa., and **J. E. Perkins,** 113 East Franklin street, Baltimore, Md., will, in future, handle the **Roller-Smith Company's** line of electrical instruments, meters and circuit breakers in the territories of Philadelphia and Baltimore, respectively. The Roller-Smith Company was formerly represented in Philadelphia and Baltimore by the Perkins-LeNoir Company.

W. N. Fenley, sales engineer of the **Kerite Insulated Wire & Cable Company,** with headquarters at Chicago, has been promoted to western manager with the same headquarters, succeeding **B. L. Winchell, Jr.,** who has been appointed vice-president, with headquarters in New York. Mr. Fenley entered railroad service with the Cleveland, Cincinnati, Chicago & St. Louis in 1895, with which company he remained for three years; being yardmaster at Greenburg, Ind., during the latter two. In April, 1898, he entered the service of the National Switch & Signal Company, with which company he was engaged in construction and maintenance work until June, 1900, when he entered the employ of the Chicago Great Western at St. Paul, Minn. During the next 10 years, he was successively foreman, inspector, office engineer, supervisor and signal engineer of that road, having been promoted to the latter position on February 9, 1908. He also acted in the capacity of consulting engineer for the McClintock Signal & Supply Company during 1906 and 1907. He left in 1910 to become sales engineer of the Union Switch & Signal Company, with headquarters at Chicago, which position he held until August, 1911, when he resigned to become signal engineer of the Panama Railroad. On September 16, 1913, the telephone, telegraph and signal departments of this company were consolidated, and Mr. Fenley was appointed superintendent of the combined organization. He resigned on June 31, 1915, and was appointed sales agent of the Kerite Insulated Wire & Cable Company, which position he was holding at the time of his recent appointment.

W. N. Fenley

Manuel Trucco, director general of the Chilean State Railways, has, according to press dispatches from Santiago, sailed for New York, where he expects to take charge of the purchases of railway equipment for the lines in his charge. He will also have charge of the inspection of equipment recently purchased in this country for the electrification of Chilean railways. His offices will be at 141 Broadway, New York. Mr. Trucco will arrive in this country about May 8.

Obituary

Charles F. Molley, vice-president and general manager of the American Boron Products Company, Inc., Reading, Pa., died on April 7.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has definitely authorized additions to its Harvey house at Gallup, N. M.

ATCHISON, TOPEKA & SANTA FE.—This company which was reported in the *Railway Age* of March 11 as contemplating, among other improvements, the construction of a new division office building at Newton, Kan., has definitely authorized the expenditure for this work along with incidental track changes to be made at that point.

BALTIMORE & OHIO.—This company has awarded a contract to the Empire Engineering Company, Baltimore, for the construction of a bridge at Brydon, W. Va., and for the preparation of roadbed for about two miles of second main track to be laid between Webster and Brydon.

CHESAPEAKE & OHIO.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of a reinforced concrete, four-track, 500-ton capacity automatic electric coaling and sanding plant, with stoker coal crushing and screening facilities, for immediate erection at Peach Creek, near Logan, W. Va. This work will cost approximately $45,000.

CHICAGO, BURLINGTON & QUINCY.—This company is now preparing plans and expects to call for bids in the near future for the construction of shop facilities at Denver, Colo., to involve the expenditure of approximately $2,000,000.

CHICAGO & NORTH WESTERN.—This company, which was noted in the *Railway Age* of April 15 as receiving bids until April 20 for the construction of a 450-ton mechanical coaling station and ash handling facilities in Chicago, the construction of which will involve an expenditure of approximately $100,000, has extended for another week the date for closing bids.

ELGIN, JOLIET & EASTERN.—This company contemplates the separation of the grade of its tracks and that of the Illinois Central at Matteson, Ill. It has also in contemplation the construction of new bridges over the Grand Calumet river at Gary, Ind., the authority for which has not yet been obtained.

GREAT NORTHERN.—This company, noted in the *Railway Age* of March 11 as receiving bids for the construction of a 500-ton reinforced concrete coaling station at Minneapolis Junction, Minn., has awarded a contract to the Ogle Construction Company, Chicago, for a station of steel construction.

ILLINOIS CENTRAL.—This company will close bids on April 25 for the construction of a joint passenger station at Gilman, Ill., with the Toledo, Peoria & Western to cost approximately $75,000.

INDUSTRIAL TERMINAL RAILWAY.—This company contemplates the construction of a switching and terminal railway 2 miles long, in Los Angeles, and to this end has obtained authority from the Railroad Commission of California to deliver to L. E. Hanchett, $420,000 of its common stock in return for advances made in acquiring right of way, rails and other materials.

KANSAS CITY TERMINAL.—This company has authorized and begun the preparation of plans for a union passenger station at Fifth street and Central avenue, Kansas City, Kans., to accommodate the Missouri Pacific and Chicago Great Western, the work to cost approximately $100,000.

LEHIGH VALLEY.—This company, in connection with its work on the Claremont (Jersey City) pier and terminal project, has awarded a contract to the Henry Steers Company, New York, for a shop and electric substation.

MISSOURI PACIFIC.—This company contemplates the renewal of the draw span and sub-structure of its Osage river bridge, and the construction of two stations, one at Washington, Mo., to cost approximately $50,000 and a second at Lake Village, Ark., to cost $25,000.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—*Annual Report.*—The annual report issued this week shows an income statement for the year ended December 31, 1921, as follows:

	1921	1920
Operating revenues	$228,925,070	.....
Operating expenses	173,217,915	.....
Net operating revenue	55,707,154	.....
Railway tax accruals (including war taxes)	14,836,268	.....
Equipment and joint facility rents (credit)	474,739	.....
Net railway operating income	41,268,307	.....
Net railway operating income (four months ending December 31, 1920)	.....	$14,863,379
Equalization charges four months ending December 31, 1920, and offsetting credit in 1921	2,612,564	2,612,564
Compensation under federal control contract	3,175,149	7,699,532
Guaranty for six months ended Aug. 31, 1920	.....	22,553,225
Other income	5,293,888	9,842,116
Gross income	52,349,909	52,350,688
Deduct:		
Taxes, rent and other charges	1,065,245	2,700,315
Interest on bonds	11,953,002	12,015,621
Net corporate income	39,331,662	37,634,752
Dividends:		
5 per cent on preferred stock	6,208,685	6,208,685
6 per cent on common stock	13,518,420	13,441,110
Surplus carried to profit and loss	19,485,014	17,881,460

BELT RAILWAY OF CHICAGO.—*Annual Report.*—The income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Operating revenues:		
Transfer switching	$4,046,918	$3,514,250
Local switching	1,411,804	1,151,735
Total railway operating revenues	5,495,789	4,730,854
Operating expenses:		
Maintenance of way and structures	595,978	649,238
Maintenance of equipment	683,189	813,100
Traffic	13,144	10,079
Transportation—rail line	2,606,054	2,913,174
General	130,394	110,338
Total railway operating expenses	4,028,761	4,495,929
Net revenue from railway operation	1,467,028	234,925
Railway tax accruals	340,320	280,375
Total non-operating income	586,286	1,915,473
Gross income	1,712,994	1,870,023
Rent for leased road	1,518,432	1,530,621
Total deductions from gross income	1,540,194	1,697,223
Net income	172,800	172,800
Dividend appropriation of income	172,800	172,800

BOSTON & MAINE.—*To Form Equipment Trust.*—At the annual meeting of the stockholders on April 12 steps were taken toward the formation of an equipment trust under which new equipment will be bought. In addition to the proceeds from the notes that are to be sold under this trust the Boston & Maine will receive a government loan of $1,212,500 which has been authorized by the Interstate Commerce Commission under the provisions of the Transportation Act.

New Haven Representation on Board.—See New York, New Haven & Hartford.

BUFFALO, ROCHESTER & PITTSBURGH.—*Annual Report.*—This company's annual report for 1921 is reviewed in an article on another page of this issue, entitled "B. R. & P. Ton-Mileage Reduced 53.92 Per Cent." See also excerpts from annual report on adjacent pages.

CAROLINA, CLINCHFIELD & OHIO.—*Equipment Notes Offered.*—An issue of $3,588,000 6 per cent equipment trust gold notes is being offered by the National City Company and Ladenburg, Thalmann & Co. The notes, which mature $276,000 each on January 15, 1923, to 1935, inclusive, are offered at prices to yield from 5.30 to 5.70 per cent., according to maturity. The notes are redeemable as a whole but not in part upon any interest date on sixty days' notice at 103 and interest.

CENTRAL VERMONT.—*Asks Authority for Equipment Trust Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $778,000 of equipment trust notes for 8 years at 6 per cent to be turned over to the American Car & Foundry Company for 700 freight cars which are to be rebuilt.

CHESAPEAKE & OHIO.—*Authorized to Abandon Ferry.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of the ferry between Russell, Ky., and Ironton, Ohio.

CHICAGO & WESTERN INDIANA.—*Annual Report.*—The income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Total operating revenue	$296,456	$233,828
Operating expenses	463,649	418,223
Net operating loss	167,192	184,395
Other income:		
Joint facility rent income	2,652,267	1,930,586
Income from lease of road	1,933,632	1,980,167
Total non-operating income, including other	4,726,215	4,444,485
Gross income	4,559,022	4,260,090
Deductions from gross income:		
Interest on bonds	3,091,533	2,365,000
Interest on unfunded debt	1,320	814,776
Railway tax accruals	672,269	412,722
Total deductions from gross income, inc. other	3,918,882	3,743,679
Net income for year	640,140	516,411

CHICAGO, MILWAUKEE & ST. PAUL.—*Equipment Notes Offered.*—A syndicate composed of Freeman & Co., Hayden, Stone & Co., New York Trust Company and the Equitable Trust Company are offering $9,500,400 6 per cent equipment trust notes. The notes are offered at prices to yield from 5.35 to 5.75 per cent. They are dated January 15, 1920 and mature $730,800 annually from 1923 to 1925, inclusive.

These notes are a direct obligation of the Chicago, Milwaukee & St. Paul Railway under an equipment trust agreement between the director general of railroads, the railroad company, and the trustee. Through supplemental agreements, 33⅓ per cent of the notes of each maturity, held by the director general, are to be stamped as subordinate to the above prior lien notes. Upon subordination, these $9,500,400 of unstamped notes will be outstanding to the extent of only about 58 per cent of the original cost of the equipment on which they are secured.

COLORADO & SOUTHERN.—*Asks Authority to Issue Equipment Trusts.*—This company has applied to the Interstate Commerce Commission for authority for the issuance of $1,425,000 of 5½ per cent equipment trust certificates.

Proposed Denial of Certificate to Abandon Branch.—The Interstate Commerce Commission has made public a tentative report of an examiner recommending that the commission deny the application of this company for a certificate authorizing it to abandon its branch line between Buena Vista and Romley, Colo., 29.42 miles, on the ground that it would deprive a large section of the benefits of rail transportation and that the record in the case affords some assurance that the future operation of this line will be more profitable than it has been in the past.

DELAWARE & HUDSON.—*Annual Report.*—The annual report issued this week shows the following income account for the year ending December 31, 1921:

	1921	1920
Railway operating revenues	$45,776,859	$45,354,299
Railway operating expenses	38,825,529	42,126,330
Net railway operating revenues	6,951,330	3,227,969
Gross railway operating income	8,218,225	3,486,238
Railway tax accruals	993,974	1,186,054
U. S. government compensation guarantee	.....	5,621,164
Net railway operating income	6,759,117	7,439,730
Dividend income	1,327,617	1,038,041
Miscellaneous income	1,569,869	1,315,427
Total non-operating income	3,432,787	2,991,287
Gross income	10,191,904	10,431,017
Deductions from gross income:		
Rent for leased roads	1,771,929	1,944,157
Interest on funded debt	3,284,580	3,228,948
Total deductions	5,254,452	5,497,855
Net income carried to profit and loss	4,937,452	4,933,163

DETROIT, BAY CITY & WESTERN.—*Six Months Guaranty Certified.*—The Interstate Commerce Commission has certified the amount of this company's guaranty for the six months following the period of federal control at $107,813, of which all but $13,331 has been paid.

GEORGIA, ASHBURN, SYLVESTER & CAMILLE.—*Asks Authority to Issue Securities.*—This company has applied to the Interstate Commerce Commission for authority for the issuance of $540,000 of capital stock, the proceeds to be used for the purchase of that part of the Hawkinsville & Florida Southern between Ashburn and Camille, Ga.

HAMPDEN RAILROAD.—*Plea Dismissed.*—Judge Jenney of the Supreme Court of Massachusetts has ordered dismissed the petition brought by Edmund D. Codman against District Attorney Saltonstall of Middlesex county, et al., in which the petitioner sought a mandatory order directing the Superior Court of Middlesex county to recall and vacate the nolle prosequis of certain indictments concerning the affairs of the Hampden Railroad.

The indictments charged members of the banking firm of F. S. Moseley & Co., Charles S. Mellen and the members of the investment boards of the Cambridge and East Cambridge Savings Banks with larceny and conspiracy, setting forth that money was fraudulently secured for the construction of the railroad.

LOS ANGELES & SALT LAKE.—*New Directors.*—W. A. Harriman, Charles A. Peabody, W. G. Rockefeller and Frank A. Vanderlip have been elected directors.

MIDLAND VALLEY.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $541,000 of first mortgage 5 per cent bonds to reimburse the treasury for expenditures for additions and betterments, to be sold at not less than 75.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Court Enjoins Dividend.*—Federal Judge Wilbur F. Booth has temporarily enjoined this road from paying $840,000 dividends on the common and preferred stocks. The Continental Insurance and Phenix Fire Insurance companies, owning 1,300 shares of preferred stock, asked that payment of a semi-annual dividend of $2 a share on the common be enjoined on the ground that the preferred stockholders must be paid at the full annual rate of 7 per cent before the common stock participated in earnings.

MISSOURI PACIFIC.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of $18,000,000 of first and refunding mortgage gold bonds to be sold at not less than 94⅞ and accrued interest. The proceeds are to be used to retire $13,641,000 of first and refunding mortgage 5 per cent bonds which matured on January 1 and to reimburse the treasury for expenditures. Arrangements had been made for the sale to Kuhn, Loeb & Co.

MOBILE & OHIO.—*Asks Authority to Issue Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $400,000 of 10 year, 6 per cent promissory notes to be used in payment for 10 Mikado locomotives.

NEW YORK CENTRAL.—*Bonds Offered.*—Harris, Forbes & Co. are offering $1,000,000 New York Central 4 per cent gold bonds (now consolidated mortgage), due January 1, 1942, at 89 and interest to yield about 4.88 per cent. These bonds are legal investment for savings banks and trust funds in New York, New Jersey, Connecticut and Massachusetts, and are listed on the New York Stock Exchange.

NEW YORK, NEW HAVEN & HARTFORD.—*Annual Meeting of Stockholders.*—President E. J. Pearson in an address to the stockholders at their annual meeting at New Haven, Conn., on April 19, called particular attention to the information contained on the first few pages of the annual report for 1921, relating to the great value and large return of industry and business in the territory served by the New York, New Haven & Hartford, and of the small percentage of such returns represented by the revenues of the company. The remarks of the annual report in this regard, according to President Pearson, may also be applied to the Boston & Maine where in the interest of the stockholders as a whole a similar possibility and policy will undoubtedly be found advisable and of advantage.

Vice-President E. G. Buckland read the address, which was in part as follows:

It will interest you to know that for the past month of March the New Haven operated at a ratio of about 77.74 in comparison with a ratio of 95.37 during the same month a year ago. The net income after all expenses, rentals and charges is estimated at about $72.000, compared to a deficit during the same month a year ago of $1,600,221. The volume of freight showed an increase. While the expenditures for maintenance were not as much as they would normally have been, nevertheless they are in proportion to similar expenditures for the preceding year, so that the comparison of operating ratios indicates better results during recent months.

Your company has not yet succeeded in securing a dissolution of the federal decree which placed its investments in the trolleys and in Boston & Maine in the hands of trustees, but is hopeful the dissolution may be brought about. There seems to be no reason to doubt that your company may legally hold these securities and resume its interest in the trolleys, and (under the limitation imposed by Massachusetts) in the Boston & Maine, so as to benefit these properties, your investment and the New England public. While the date within which by the decree the trustees are required to dispose of your holdings has been postponed from time to time, there has never been a time when these holdings could have been sold at prices which would have been reasonable or in your interest. As your ownership of Boston & Maine stock represents since the reorganization of the Boston & Maine but a minority, slightly over 28 per cent, it is not intended that the New Haven will assume or attempt to assume control of the Boston & Maine. With representation on the board, however, proportional to your company's holdings, your company would be admitted to its counsels as it of right ought to be, and would be in a position: first, to further the interests of the Boston & Maine to the fullest extent; second, to co-operate with the Boston & Maine in promoting all of those matters which are to the advantage of both companies and to the disadvantage of neither; and, third, to assist in the solution of the important problems which will arise in respect to plans proposed by the Interstate Commerce Commission for consolidation of the railways under the provisions of the Transportation Act of 1920.

While the traffic of your company has decreased, incidental to the change from war-time to the present conditions of business, the reduction is less marked than throughout the country as a whole. As a result, the management of your company looks forward with confidence to the continued importance and supremacy, commercially, of the territory which it serves.

Extends Time for Deposits.—The company has announced a further extension of the period in which the 4 per cent debentures may be deposited under the three-year plan approved by the Interstate Commerce Commission. The extended period is to be subject to termination by the directors without notice.

A statement issued by the company said that the plan can become effective only if it is accepted by the debenture holders with practical unanimity, as it has been impossible to make provision for the payment of any debentures, the holders of which do not accept the company's offer of extension.

NORFOLK & WESTERN.—*New Director.*—Samuel P. Bush, of Columbus, Ohio, has been elected a director to succeed Joseph Wood, of Pittsburgh, deceased.

PENNSYLVANIA.—*Stockholders Pass Confidence Resolution.*—The stockholders at their annual meeting on April 11 gave a vote of confidence to the officials of the company for their management during the business depression.

SOUTHERN.—*Asks Authority for Equipment Certificates.*—This company has applied to the Interstate Commerce Commission for authority to guarantee the payment of $9,300,000 of 5½ per cent equipment trust certificates.

WEST JERSEY & SEASHORE.—*Stockholders Adopt Resolution.*—The stockholders at their annual meeting on April 13 adopted the following resolution:

Whereas, On April 30, 1913, the stockholders of this company voted to lease properties and franchises to the Pennsylvania Railroad Company for a term of 999 years, but on July 23, 1913, the New Jersey Public Service Commission disapproved the lease, and the decision of the commission was approved by the courts; that since that date the railroad situation of the country has undergone considerable changes through passage of the Transportation Act, etc., now be it

Resolved, That the board of directors appoint a committee of three stockholders to confer with the management of the Pennsylvania Railroad Company, with a view of reopening the offer to lease, said committee to review the matter from all angles, and report to the stockholders at an adjournment of this meeting, the date of which is to be fixed by the management.

WHEELING & LAKE ERIE.—*Equipment Notes Offered.*—Hemphill, Noyes & Co., Cassatt & Co. and Freeman & Co. are offering $2.649,400 Wheeling & Lake Erie equipment trust 6 per cent gold notes, maturing in equal annual instalments, from January 13, 1923, to January 15, 1935, inclusive, at 5.40 per cent basis for 1923 maturity, 5.50 per cent basis for 1924 maturity, 5.60 per cent basis for 1925 maturity, 5.70 per cent basis for 1926 maturity, 5.80 per cent basis for 1927 to 1933 maturities and 5.75 per cent basis for 1934 and 1935 maturities.

Equipment Trusts Sold

The director general announces additional sales, at par plus accrued interest, of railroad equipment trust certificates maturing January 15, 1923 to January 15, 1935, inclusive, now held by the government, to:

Edward Lowber Stokes & Co., Philadelphia, Pa.; Harrison, Smith & Co., Philadelphia, Pa.; Biddle & Henry, Philadelphia, Pa., and Commercial Trust Co., Texas & Pacific Railway, $1,381,900.

National City Co., New York; Ladenburg, Thalmann & Co., and Alfred Borden, Carolina, Clinchfield & Ohio, $3,588,000.

Riggs National Bank of Washington; Redmond & Co., New York; Cassatt & Co., and Lewis & Snyder, Philadelphia, Grand Trunk Railway of Canada, $520,000.

Freeman & Co., New York; Chicago, Milwaukee & St. Paul, $9,500,400.

Hemphill, Noyes & Co., New York; Wheeling & Lake Erie, $2,649,400.

Cassatt & Co., Philadelphia; Chicago & Western Indiana, $161,200, and Rutland Railroad, $213,200.

Redmond & Co., New York; Charleston & Western Carolina, $481,000.

Sales comprise approximately two-thirds of all the maturities of these equipment trust issues. The balance of one-third of all maturities will be stamped as subordinated. The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is $249,210.300. This leaves a balance of only about $23,000,000 yet to be sold.

Trend of Railway Stock and Bonds Prices

	April 18	Last Week	Last Year
Average price of 20 representative railway stocks, close of business.....	64.99	64.27	53.53
Average price of 20 representative railway bonds, close of business.....	85.82	84.54	73.63

Annual Report

Buffalo, Rochester & Pittsburgh, Thirty-Seventh Annual Report

The Directors of the Buffalo, Rochester and Pittsburgh Railway Company submit to the Stockholders the following report for the year ending December 31, 1921.

ROAD OPERATED

	1921. Miles.	1920. Miles.	Increase.
Owned	368.31	368.31	
Leased	90.30	90.30	
Trackage rights	131.11	131.11	
Total length of road operated	589.72	589.72	
Second track	212.59	212.59	
Sidings	455.36	455.13	.23
Total miles of all tracks, all steel rail.	1,257.67	1,257.44	.23

CORPORATE INCOME

	1921.	1920.	Increase	Decrease
OPERATING INCOMES:				
Revenues	$14,362,406.74	$9,145,766.08	$5,216,640.66	
Expenses	13,836,205.06	7,126,122.02	6,710,083.04	
Net revenue	$526,201.68	$2,019,644.06		$1,493,442.38
Tax accruals	339,300.00	507,000.00		167,700.00
Miscellaneous revenue	1,222.59	46.63	1,175.96	
	$340.522.59	$507,046.63		$166,524.04
Total operating income	$185,679.09	$1,512,597.43		$1,326,918.34
NON-OPERATING INCOME:				
Rental—U. S. R. R. Admin.		557,935.43		$557,935.43
Rental—Guaranty Period	75,321.54	1,759,612.97		1,684,291.43
Other items	1,099,608.59	731,439.71	368,168.88	
	$1,174,930.13	$3,048,988.11		
Gross income.	$1,360,609.22	$4,561,585.54		$3,200,976.32
DEDUCTIONS:				
Rentals of leased lines, interest, etc.	$2,307,206.92	$2,235,825.18	$71,381.74	
Net income (Def.)	$946,597.70	$2,325,760.36		$3,272,358.06
APPROPRIATIONS:				
Pension and Fire Insurance Funds	18,910.58	30,710.95		11,800.37
Surplus available for dividends. (Def.)	$965,508.28	$2,295,049.41		$3,260,557.69
Return on capital stock	(Loss) 5.85%	13.91%		19.76%

The income statement shows the results for the year compared with the corporate results of 1920, when the property was operated and maintained by the Company on its own account for only the last four months of that year. In both years the lap-over amounts belonging to the Federal Control and Guaranty Periods are excluded.

Following the precedent established for the last three years, the full details of operations for each period and the combined results have been given separately in an appendix to this report.

The decrease of $167,700 in taxes is chiefly the saving effected by reason of reduced Income and Excess Profits taxes.

As is well known, conditions affecting your Company, in common with most of the railroads of the United States, were the worst ever suffered in the course of a single year, resulting in a deficit for the first time since 1894.

During the year several partial payments were received to apply on the amount due from the U. S. Government for the guaranteed net railway operating income, March to August, 1920, inclusive. It is expected that final settlement will be made in the near future.

DIVIDENDS

Dividends, out of the accumulated surplus in Profit and Loss Account, were paid in cash on:

			1921.		1920.
Preferred stock	$6,000,000	6%	$360,000	6%	$360,000
Common stock	10,500,000	4%	420,000	4%	420,000
Total	$16,500,000		$780,000		$780,000

Since the close of the fiscal year your Board of Directors has declared semi-annual dividends of three per cent. on the preferred stock and two per cent. on the common stock, payable February 15th, 1922.

CAPITAL STOCK.

There has been no change during the year in this account. The total outstanding capital stock of the Company amounts to $16,500,000, and consists of $6,000,000 preferred stock and of $10,500,000 common stock.

FUNDED DEBT.

Acting under the provisions of the Transportation Act of 1920 a loan of $1,000,000 to aid in paying off Rochester & Pittsburgh R. R. 6% Bonds maturing February 1, 1921, was authorized, applied for, approved and made.

As evidence thereof, the Company gave its promissory note dated January 4, 1921, payable five years after date, or January 4, 1926, with interest at 6 per cent. per annum payable semi-annually, and secured by $1,600,000 consolidated 4½% mortgage bonds as collateral.

With the approval of all governmental authorities, and in accordance with the provisions of the Consolidated Mortgage of 1907, the Trustee delivered to the Company consolidated 4½% mortgage bonds, which were all sold during the year, for corporate purposes, as follows:

To reimburse the Treasury for payments made for improvements and betterments	$1,500,000
To apply toward the entire issue of the following underlying bonds retired:	
Rochester & Pittsburgh R. R. Co. 1st Mtg. 6% bonds	1,300,000
Equipment Agreement 4½% Series C bonds	1,000,000
To apply toward 50% of the following underlying equipment bonds retired:	
$118,000 Series E, 4½% bonds	59,000
180,000 Series F, 4½% bonds	90,000
Total bonds issued and sold during the year	$3,949,000

Bonds retired during the year:

Rochester & Pittsburgh R. R. Co. 1st mtg. 6%			$1,285,000	
do		consol. " "	90,000	
Equipment	Agreement Series	C	686,000	
do		E	134,000	
do		F	180,000	
do		G	182,000	
do		H	125,000	
do		J	124,000	
do		K	80,000	
do		10	133,600	
			$3,019,600	
Less reduction of amount of bonds held in funds			27,000	$2,992,600

The net result is an increase in the funded debt of the Company during the year of $1,956,400.

The bonds in the Treasury, pledged and unpledged, amounting to $4,081,000, remain the same as last year.

COST OF ROAD.

Capital account was charged during the year with $286,944.26 for investment in road as follows:

Subway, Brown St., Rochester, N. Y.	$100,346.60
New water tank, Beavers, N. Y.	4,166.73
New bridge, Indiana, Pa.	7,057.39
Increased weight of rail, etc.	105,444.31
Additional sidings, yard extensions, etc.	50,695.91
Miscellaneous	19,233.32
Total	$286,944.26

The work on the subway, Brown St., Rochester, N. Y., undertaken jointly by the City, the New York Central Railroad Company, and your Company, referred to in last year's report, and all the other work undertaken during this year are practically completed. As far as possible the expenditures for additions and betterments were confined to actual necessities.

COST OF EQUIPMENT.

Expenditures were made for additions to equipment as follows:

Sundry locomotive betterments		$4,538.13
Final balance on eight hundred steel gondola cars purchased per allocation of U. S. R. R. Administration		32,440.25
Sundry car betterments		5,750.05
		$42,728.43

There was credited for equipment sold, transferred or destroyed, the following book values, a part of which, less salvage, was charged to Operating Expenses, and the balance, representing the depreciation accrued since June 30, 1907, was charged to the Accrued Depreciation account:

Twelve locomotives	$176,913.54	
Two passenger train cars	6,294.39	
One hundred and eighty-five freight train cars	149,293.25	
One company's service car	1,349.98	
Two Mogul tractors	1,970.00	335,821.16
Making a net decrease of		$293,092.73

In pursuance of the policy outlined in last year's report, twelve of the lighter type locomotives and one hundred and forty-seven gondola cars were sold at fair prices, affecting the rolling stock statistics as follows:

The total tractive power of engines now aggregates 13,688,103 pounds, a decrease of 593,742 pounds during the year.

The average tractive power of each engine increased 770 pounds, being 46,400 pounds as against 45,630 pounds a year ago.

The total carrying capacity of cars in freight service now amounts to 737,255 net tons, a decrease of 10,960.

The average carrying capacity or efficiency of each freight car increased .08 tons, being 44.20 tons as against 44.12 tons.

Of the cars in passenger service 48.35 per cent. are of all steel construction, and in the freight service 95.42 per cent. of the cars are all steel, or are equipped with steel underframes.

The following table indicates the relative changes in equipment for the past ten years.

	Tractive power of engines in pounds.		Capacity of cars in freight service in tons of 2000 pounds.	
	Average of each engine.	Aggregate tractive power.	Average for each car.	Aggregate capacity.
1912	33,180	9,622,160	40.23	668,744
1913	34,017	9,932,893	41.26	708,813
1914	34,782	10,643,255	42.29	737,498
1915	35,999	11,627,535	43.19	751,531
1916	36,257	11,493,536	43.25	750,847
1917	39,060	12,773,410	43.37	737,327
1918	43,312	16,025,362	43.94	777,657
1919	44,100	15,346,830	43.97	771,541
1920	45,630	14,281,845	44.12	748,215
1921	46,400	13,688,103	44.20	737,255
Increase over 1912	13,220	4,065,943	3.97	68,511
Per cent	39.8	42.3	9.9	10.2

PASSENGER REVENUES.

The corporate gross passenger revenue amounted to $1,794,927.24. The average rate received per passenger per mile increased .392 cent, being 3.341 cents as compared with 2.949 the preceding year.

The average distance each passenger was carried decreased 1.1 miles, being 28.1 miles against 29.2 miles.

Passengers carried in 1921	1,913,670	
Passengers carried in 1920	2,232,013	
A decrease of 14.26% or		318,343
Passengers carried one mile in 1921	53,730,699	
Passengers carried one mile in 1920	65,085,159	
A decrease of 17.45% or		11,354,460

FREIGHT REVENUES.

The corporate gross freight revenue amounted to $11,928,151.87. Excepting minor reductions in rates of certain commodities, the general rate structure remained practically the same throughout the year, the last general increase (34%), having been made on September 1, 1920.

The average rate received per ton per mile increased .278 cent, being 1.049 cents as compared with .771 cent last year.

The average distance each ton was hauled decreased 13.6 miles, being 151.5 miles, against 165.1 miles a year ago.

The revenue tonnage moved was the smallest in the history of the Company since 1904, and is as follows:

	1921.	1920.	Decrease.
Bituminous coal	3,854,947	9,402,558	5,547,611
Coke	154,388	596,781	442,393
Iron ore	99,727	642,614	542,887
Pig and bloom iron	94,177	344,337	250,160
Other freight	3,300,670	3,954,892	654,222
Total	7,503,909	14,941,182	
A decrease of 49.78% or			7,437,273
Tons moved one mile in 1921			1,136,943,603
Tons moved one mile in 1920			2,467,398,051
A decrease of 53.92% or			1,330,454,448

A decline of 23.3% was registered in railroad traffic of all lines in the United States during 1921, the greatest ever recorded in American transportation history. Your line suffered a much greater loss of tonnage, due to the extraordinary unfavorable conditions existing in the Central Pennsylvania bituminous coal fields, from which approximately 65% of your traffic is derived. Also, the abnormal conditions existing in the steel trade caused a severe shrinkage of coke and ore tonnage.

The average number of revenue tons carried one mile per revenue freight train mile, excluding the mileage of helping engines, decreased 188.43 tons, being 754.15 tons against 942.58 tons a year ago.

The average number of revenue tons carried one mile per revenue freight engine mile, including the mileage of helping engines, decreased 82.57 miles, being 519.57 miles against 602.14 miles a year ago.

The averages for the past ten years are as follows:

	Train load.	Engine load.
Year ending June 30, 1912	647	439
1913	710	462
1914	694	454
1915	707	477
1916	786	502
Six months ending December 31, 1916	792	510
Year ending December 31, 1917	836	545
1918	943	602
1919	884	586
1920	943	602
1921	754	520
Increase over 1912	107	81
Per cent	16.5	18.5

The non-revenue freight traffic, not included in any of the other figures of this report, is as follows:

	1921.	1920.
Number of tons	655,524	1,105,887
Number of tons carried one mile	59,251,341	106,575,272

EXPENSES.

The total corporate operating expenses were as follows:

Maintenance of way	$1,974,309.33
Maintenance of equipment	4,908,568.20
Traffic	215,078.93
Transportation	6,223,691.49
Miscellaneous operations	30,120.12
General	485,696.76
Transportation for investment, Cr.	1,259.77
Total	$13,836,205.06

The additional expenses chargeable as lap-overs to the Federal Control and Guaranty Periods were 80,826.51

Grand total expenses $13,917,031.57

The percentage of each group of operating expenses, all periods combined, to the combined operating revenue for the past six years is as follows:

	1921.	1920.	1919.	1918.	1917.	1916.
Maint. of way	13.73	16.58	16.95	15.28	9.71	12.39
Maint. of equipment	34.31	31.05	37.73	32.29	27.00	23.95
Traffic	1.50	1.03	1.26	1.02	1.28	1.20
Transportation	43.56	45.98	48.73	44.26	38.82	33.74
Misc. operations	.21	.17	.20	.14	.14	.14
General	3.25	2.46	2.82	2.13	2.37	2.18
Transp. for Inv., Cr.	.01	.06	....	....	....	....
	96.65	97.21	107.69	95.12	79.32	73.60

The condition of the Company's equipment at the end of Federal control is causing an unusual outlay for repairs, still under way. 500 steel gondola cars were repaired outside of your Company's shops, and arrangements have been made for the repairs of 1,000 more, to be completed during the next three months.

The increase in wages and the changes in working conditions during and since Federal control; the reclassification of employes, and special allowances granted by the Director General or ordered by the Labor Board; have created a serious condition now affecting the economical operation of your road. Partial relief was obtained from an order of the Labor Board effective July 1, authorizing an average reduction in wages of approximately 10% and as far as possible further reductions and economies were made consistent with safety and reasonably adequate service, to offset the reduced income.

The average cost per ton per mile is 1.001 cents, an increase of .253 cent over last year.

FIRE INSURANCE FUND.

This fund, created July 1st, 1892, was discontinued on August 11th, 1921, and its surplus transferred to the following accounts:

Profit and loss	$425,868.82
Operating reserve—Fire Insurance	29,717.45
Total	$455,586.27

PENSION FUND.

This fund, created July 1, 1903, was discontinued on May 31, 1921, and its surplus of $251,728.76 transferred to Profit and Loss account. In the future all expenditures for pensions will be made directly from available current assets.

There were 88 pensioners on the roll on December 31, 1921, a net increase of 8 during the year.

GENERAL REMARKS.

The valuation of your lines by the Interstate Commerce Commission began July 1, 1917, and is about 90% completed. The amount expended to date on this account has reached $194,607.33.

The balance of $2,374,295.94 received from the Director General of Railroads in final settlement for the use and operation of your property during Federal control, after adjusting and closing the several accounts with the United States Railroad Administration, was by order of the Interstate Commerce Commission dated January 25th, 1922, transferred to Profit and Loss account.

On March 1, 1921, the agreement with the Western Union Telegraph Company was revised and renewed for a term of 15 years, and to continue thereafter until a year's notice in writing is given by either party.

In December, 1921, an agreement was made with the New York Central Railroad Company granting it further trackage rights over your line from C. & M. Junction, Pa., to Rossiter, Pa., a distance of 18.07 miles. The agreement extends over a period of 15 years from September 1, 1920, and is to continue thereafter until canceled by two years' notice from either party.

A "Full Crew Law" ostensibly to decrease accidents was enacted by the State of Pennsylvania in 1911. Its futility being realized, the law was repealed on May 5th, 1921, relieving your Company, under normal traffic conditions, of a needless expense of approximately $96,000 per annum. A similar law, effective in New York State since 1910, still remains on the Statute Books.

The acknowledgments of the Board are renewed to its officers and employes for their faithful and efficient service.

By order of the Board,

WILLIAM T. NOONAN,
President.

Rochester, N. Y.,
March 24, 1922.

PROFIT AND LOSS ACCOUNT DECEMBER 31, 1921

Credit			Debit		
Balance Surplus December 31, 1920		$5,434,542.67	Debit Balance transferred from Income Account (page 23)		$965,508.28
Unrefundable overcharges		6,240.36	Dividend appropriation of surplus—		
Donations		1,244.52	Preferred stock—		
Miscellaneous Credits—			(No. 55) 3% on $6,000,000, paid February 15, 1921	$180,000.00	
Discount on funded debt retired	$7,749.99		(No. 56) 3% on $6,000,000, paid August 15, 1921	180,000.00	
Unclaimed wages, etc.	3,818.22		Common stock—		
Transferred from Pension Fund	251,728.76		(No. 42) 3% on $10,500,000, paid February 15, 1921	315,000.00	
Transferred from Insurance Fund	425,868.82		(No. 43) 1% on $10,500,000, paid August 15, 1921	105,000.00	780,000.00
Final settlement, U. S. R. R. Administration	2,374,295.94		Surplus appropriated for investment in physical property		1,244.52
Sundry items	1,096.77	3,064,558.50	Debt discount extinguished through surplus		476,713.60
			Loss on retired road and equipment		3,256.05
			Miscellaneous Debits—		
			Loss on abandoned projects	$12,674.51	
			Loss on Fund securities transferred	31,624.47	
			Sundry items	6,683.99	50,982.97
					2,277,705.42
Total		$8,506,586.05	Balance Surplus December 31, 1921 (page 15)		$6,228,880.63

[ADVERTISEMENT]

Railway Officers

Financial, Legal and Accounting

A. M. Martin, assistant treasurer of the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., has also been elected assistant secretary and transfer agent, to succeed **J. B. Hill,** who has been elected treasurer and appointed assistant to the president to succeed **J. H. Ambrose,** who has retired. Mr. Ambrose will continue to serve as a director and as a member of the finance committee.

J. W. Broome, whose appointment as secretary and assistant treasurer of the Western Maryland with headquarters at New York was announced in the *Railway Age* of April 8, page 897, was born on July 11, 1890, in Brooklyn, N. Y., and attended high school and normal school in that city. He entered the service of the Western Maryland in 1907 as a clerk. In October, 1912, he became chief clerk to the secretary and treasurer and served in that position until September, 1921, with the exception of the period from June, 1918, to August, 1919, when he was with the army overseas. On September 20, 1921, he was appointed secretary and assistant treasurer and was serving in that position at the time of his recent promotion.

Operating

A. G. Mitchell, superintendent of the West Jersey & Seashore (Pennsylvania), has been promoted to secretary of the Association of Transportation officers of the Pennsylvania System with headquarters at Broad Street Station, Philadelphia. **H. H. Garrigues,** superintendent of the Delaware division of the Pennsylvania, suceeds Mr. Mitchell on the West Jersey & Seashore with headquarters at Camden, N. J. **I. B. Sinclair,** assistant superintendent of the Philadelphia division with headquarters at Harrisburg, Pa., has been promoted to superintendent of the Delaware division and has been succeeded at Harrisburg by **J. B. Phelan,** freight trainmaster of the Middle division with headquarters at Altoona, Pa. Mr. Phelan has been succeeded at Altoona by **C. E. Whitlock,** trainmaster of the Schuylkill division with headquarters at Reading, Pa., who in turn has been succeeded by **A. M. Seward,** assistant trainmaster of the Schuylkill division. These changes were effective April 15.

Traffic

Val. Kuska has been appointed colonization agent of the Chicago, Burlington & Quincy, with headquarters at Omaha. Neb., effective April 1, to succeed F. B. Howard, deceased.

H. W. Bonderat, freight traffic representative of the Southern, with headquarters at Nashville, Tenn., has been promoted to commercial agent, with the same headquarters to succeed **J. W. Frank,** who has been promoted to freight agent, with headquarters at Savannah, Ga.

G. R. McIntosh, general agent of the Pacific Fruit Express, with headquarters at Los Angeles, Cal., has been promoted to superintendent at San Francisco, with jurisdiction over the agencies at Sacramento, San Francisco, Los Angeles, Portland, Ore., and Houston, Tex., to succeed **H. Gidding,** who has been promoted to assistant general manager at San Francisco, with jurisdiction over the lines of the Southern Pacific, the Los Angeles & Salt Lake, and the Western Pacific. **R. J. Bailey,** superintendent of ice plants at San Francisco, has been appointed superintendent of refrigeration, with jurisdiction over the Southern Pacific, the Los Angeles & Salt Lake and the Western Pacific. **J. B. Crawford,** superintendent of transportation at Chicago, has been promoted to assistant general manager at Chicago, with jurisdiction over the lines of the Union Pacific, the Oregon Short Line, and the Oregon-Washington Railroad & Navigation Company. **C. E. Carner,** chief clerk to the superintendent of transportation at Chicago, has been promoted to traffic manager to succeed **R. C. Dearborn,** resigned to become chairman of the National Perishable Freight Committee. **J. Van Renseller,** superintendent of refrigeration, with headquarters at Omaha, has been promoted to superintendent in charge of traffic with jurisdiction over the Union Pacific. **C. F. Gunnell,** general agent at Ogden, Utah, has been promoted to superintendent of transportation with jurisdiction over the Oregon Short Line, with the same headquarters. **R. M. Whitehead,** general agent at Portland, Ore., has been appointed superintendent of traffic with jurisdiction over the Oregon-Washington Railroad & Navigation, with the same headquarters and **T. G. Wall,** assistant superintendent of ice plants, with headquarters at Omaha, Neb., has been promoted to superintendent of refrigeration on the lines of the Union Pacific, the Oregon Short Line and the O.-W. R. & N., with headquarters at Omaha.

Obituary

John Carstensen, vice-president of the New York Central Lines and for over 50 years connected with that system, died at his home in Scarsdale, New York, on April 14. Mr. Carstensen was born on August 14, 1854, in New York City. He spent his early childhood on the island of Santa Cruz, then one of the Danish West Indies. His family returned to the United States when he was ten years old. Mr. Carstensen was educated at Cayuga Lake Academy, Aurora, N. Y., Alexander Military Institute, White Plains, N. Y., and the high school at Clinton, New York. On July 10, 1871, he entered the service of the New York Central & Hudson River Railroad, of which company he became successively assistant treasurer and comptroller and was later elected a vice-president of the New York Central System and a director of a number of its subsidiaries.

J. Carstensen

Frank J. Woulfe, assistant traffic manager of the Lehigh Valley, died suddenly in New York on April 15, as the result of heart trouble. Mr. Woulfe was born at Fort Wayne, Ind., on November 9, 1863, and was educated in the public schools. He began railroad work on April 1, 1879, as night bill clerk for the Wabash. From then until 1890 he served as cashier and in various clerical capacities. In 1890 he was appointed traveling freight agent of the Lehigh & Wabash Despatch and the Lehigh Valley Transportation Company with headquarters at Decatur, Ill. In 1898 he became general agent of the Lehigh Valley at St. Louis, Mo., and was transferred to New York as city freight agent in 1901. Later he became general eastern freight agent and on August 1, 1909, was appointed general freight agent. At the termination of federal control, Mr. Woulfe was appointed assistant traffic manager.

F. J. Woulfe